

Lexmark
MS310/312/315/410/415/510/610
&
MX310/410/510/610

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Mono Product Study Guide

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Revision Information:

4/7/2014 – Three new models added to the printer family. These are the MS312, MS315, and the MS415. Serviceability is identical to the existing models that were announced in the fall of 2012. Revision 2.0 of this Study Guide incorporates the new printer information into the guide.

5/1/2015 – The engineering change (EC) discussed in this document describes the laser printhead technology update for small and medium workgroup monochrome printers. In this update, the Polygon-type printhead will be replacing the conventional Galvo printhead.

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Revision: 2.2

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Laser Printer Naming Convention

Beginning in the fall of 2012, Lexmark changed the naming convention of its laser printers based on a 5-digit identifier. The chart below outlines what each of these codes mean.

MS812dn

Suffix Convention	
n	Network
d	Duplex
e	eTask
h	Hard Drive
x	High Capacity Input Tray
f	Finisher
m	Mailbox
t	Tray
p	Hole Punch

Model: identifies the specific model within a class and generation

Gen: changes with each generation of product introduced in that class

Class: higher the number, greater level of performance and duty cycle

"S" for single function and **"X"** for multifunction

"M" for monochrome laser and **"C"** for color

Product Lineup

Lexmark MS31x/MS41x/MS510/MS610 Series

Model Name	Machine Type – Model Number	Network	Duplex	Control Panel	Solutions Enabled
MS310d	4514-220	N	Y	LED	N
MS310dn	4514-230	Y	Y		N
MS312dn	4514-330	Y	Y	2-Line APA Mono LED	N
MS410d	4514-420	N	Y		N
MS410dn	4514-430	Y	Y		N
MS315dn	4514-335	Y	Y		N
MS415dn	4514-530	Y	Y	2.4" Color LCD	N
MS510dn	4514-630	Y	Y		N
MS610dn/dtn	4514-635	Y	Y		N
MS610de/dte	4514-646	Y	Y	4.3" Color Touch	Y

Lexmark MX310/MX410/MX510/MX610 Series

Model Name	Machine Type – Model Number	Network	Duplex	Control Panel	Solutions Capable
MX310dn	7015-270	Y	Y	2.4" Color LCD	N
MX410de	7015-470	Y	Y	4.3" Color Touch	Y
MX510de	7015-630	Y	Y		Y
MX511de/dte	7015-670	Y	Y		Y
MX511dhe	7015-675	Y	Y		Y
MX610de	7016-630	Y	Y	7" Color Touch	Y
MX611de/dte	7016-670	Y	Y		Y
MX611dhe	7016-675	Y	Y		Y

Technical Information

Printer Specifications: MS310/312/315/410/415/510/610

	MS310d/dn MS312dn	MS315dn	MS410d/dn	MS415dn	MS510dn MS610dn	MS610de
Performance						
Fuser Technology	Belt Fuser					
Processor	6170 (Dual Core 800 MHz)					
Memory						
Standard Memory ¹	128MB	256MB	128MB (d) 256MB (dn)	256MB	256MB	512MB
Max Memory	128MB	256MB	128MB (d) 256MB (dn)	256MB	1280MB	2.5GB
Memory Options	None		512MB, 1GB (x16)	None	512MB, 1GB (x16)	1GB, 2GB (x32)
Optional Flash Memory	256MB					
Hard Drive	None					Optional 240GB+
Connectivity						
Connectivity – Standard	10/100 Ethernet (MS310d/dn), Gigabit Ethernet (MS312dn), USB, Parallel	USB-B 2.0 (Rear), Gigabit Ethernet (Additional Parallel Port option for MS415 only)			USB-A 2.0 (Front), USB-B 2.0 (Rear), USB-A 2.0 (Rear for MS610de only), Gigabit Ethernet	

	MS310d/dn	MS312dn MS315dn	MS410d/dn	MS415dn	MS510dn MS610dn	MS610de
Connectivity – Optional	802.11x Wireless – <i>MS310dn and MS312dn only</i>	802.11x Wireless	Parallel (SPR only); 802.11x Wireless – <i>MS410dn only</i>	802.11x Wireless	Parallel (SPR only); 802.11x Wireless	Parallel, Serial, Fiber via ISP Pod; 802.11x Wireless
USB Host	None				Front USB-A 2.0 Host (low, full, high); Rear USB-A Host (low, full, high)	Front USB-A 2.0 Host (low, full, high); Rear USB-A Host (low, full, high)
Option Slots						
ISP Slots	None				Yes	

¹ The standard memory is embedded into the controller board.

Duty Cycle: MS31x/MS41x/MS510/MS610 Series

Printer Model	Recommended Monthly Page Volume ¹	Max Monthly Duty Cycle ²
MS310	500 to 2,500 pages	50,000 pages
MS312	500 to 2,500 pages	50,000 pages
MS315	500 to 4,000 pages	60,000 pages
MS410	750 to 7,200 pages	80,000 pages
MS415	750 to 7,200 pages	80,000 pages
MS510	1,500 to 14,000 pages	80,000 pages
MS610dn	3,000 to 16,000 pages	100,000 pages
MS610de	3,000 to 16,000 pages	150,000 pages

¹ **Recommended Monthly Page Volume** is a range of pages that helps customers evaluate Lexmark's product offerings based on the average number of pages customers plan to print on the device each month. Lexmark recommends that the number of pages per month be within the stated range for optimum device performance, based on factors including: supplies replacement intervals, paper loading intervals, speed, and typical customer usage.

² **Maximum Monthly Duty Cycle** is defined as the maximum number of pages a device could deliver in a month using a multi-shift operation. This metric provides a comparison of robustness in relation to other Lexmark printers and MFPs.

Print Speed: MS31x/MS41x/MS510/MS610 Series

Media Size	Printer Models				
	MS310 MS312	MS315	MS410 MS415	MS510	MS610dn MS610de
Letter, Tray 1 (PPM)	35	37	40	45	50
A4, Tray 1 (PPM)	33	35	38	42	47

Notes: The Claim Values above specifies the maximum throughput, in Pages Per Minute (PPM), based on resolution and media size. For media sizes smaller than A4 and Letter, throughput is reduced to protect the printer from thermal damage. Speed values can be up to and as fast as the rated speeds above.

Time to First Print (TTFP): MS31x/MS41x/MS510/MS610 Series

Printer Mode	Printer Models				
	MS310	MS312 MS315	MS410	MS415	MS510 MS610dn MS610de
Time from Ready Mode (sec)	6.5	6.5	6.5	6.5	6.5
Time from Sleep Mode (sec)	9.0	9.5	9.0	9.5	9.0

Notes: Time To First Page (TTFP) is defined to be the time from the moment when the host sends the print signal until the moment the trailing edge of the first letter page leaves the exit feed rollers. TTFP is measured using a moderate-coverage text page.

Time to First Page, as fast as rated times above.

Media Options: MS31x/MS41x/MS510/MS610 Series

Options	
250-Sheet Tray	
550-Sheet Tray	
Swivel Cabinet	
Adjustable Printer Stand	

Notes:

- Only the above paper handling options are compatible with MS31x, MS41x, MS510, and MS610 Series printers. Paper handling options for other current printers and legacy printers are not supported on MS31x, MS41x, MS510, and MS610 Series printers.
- The Lexmark MS31x, MS41x, MS510, and MS610 Series do no support output options.

The authoritative tables of maximum Printer Paper Options/Furniture combinations are publicly available at www.lexmark.com/multifunctionprinters. Please refer to this information when purchasing additional paper input options for any of the MS31x/MS41x/MS510/MS610Series printers.

Technical Information

Specifications: MX310/MX410/MX510/MX610

	MX310	MX410	MX510	MX511	MX610	MX611								
Performance														
Fuser Technology	Belt Fuser													
Processor	6170 (Dual Core 800 MHz)													
Memory														
Standard Memory ¹	256MB	512MB		1GB										
Max Memory	256MB	2.5GB		3GB										
Memory Options	None	1024MB or 2048MB												
Hard Drive	None		Standard 120GB (MX511dhe); Optional 120GB (MX510de & MX511de)	Standard 120GB (MX611dhe); Optional 120GB (MX610de,MX611de)										
Connectivity														
Connectivity – Standard	USB-B 2.0 high speed, 10/100/1000 Base TX, 10/100 Base TX													
Connectivity – Optional	Wireless (Swiss)		Wireless (Brie), RS-232 serial, 1284-B parallel	Wireless (Brie), RS-232 serial, 1284-B parallel										
USB Host – Front	None	USB-A 2.0 High Speed												
USB Host – Rear	USB-B 2.0 High-speed													
Option Slots														
DRAMM DIMM Slots	None	1 Slot												
ISP Slots	1 Slot													
eMMC Slots	1 Slot													

¹ The standard memory is embedded into the controller board.

Duty Cycle: MX310/MX410/MX51x/MX61x

Printer Model	Recommended Monthly Page Volume ¹	Max Monthly Duty Cycle ²
MX310dn	250 - 6,000 pages	50,000 pages
MX410de	750 - 10,000 pages	80,000 pages
MX51x	2,000 - 12,000 pages	100,000 pages
MX61x	2,000 - 15,000 pages	150,000 pages

¹ **Recommended Monthly Page Volume** is a range of pages that helps customers evaluate Lexmark's product offerings based on the average number of pages customers plan to print on the device each month. Lexmark recommends that the number of pages per month be within the stated range for optimum device performance, based on factors including: supplies replacement intervals, paper loading intervals, speed, and typical customer usage.

² **Maximum Monthly Duty Cycle** is defined as the maximum number of pages a device could deliver in a month using a multi-shift operation. This metric provides a comparison of robustness in relation to other Lexmark printers and MFPs.

Print Speed: MX310/MX410/MX51x/MX61x

Media Size	Printer Models			
	MX310dn	MX410de	MX51x	MX61x
Letter, Tray 1 (PPM)	35	40	45	50
A4, Tray 1 (PPM)	33	38	42	47

Notes: The Claim Values above specifies the maximum throughput, in Pages Per Minute (PPM), based on resolution and media size. For media sizes smaller than A4 and Letter, throughput is reduced to protect the printer from thermal damage. Speed values can be up to and as fast as the rated speeds above.

Time to First Print (TTFP): MX310/MX410/MX51x/MX61x

Printer Mode	Printer Models			
	MX310	MX410	MX51x	MS61x
Time from Ready Mode (sec)	6.5	6.5	6.5	6.5
Time from Sleep Mode (sec)	9.0	9.0	9.0	9.0

Notes: Time To First Page (TTFP) is defined to be the time from the moment when the host sends the print signal until the moment the trailing edge of the first letter page leaves the exit feed rollers. TTFP is measured using a moderate-coverage text page.

Time to First Page, as fast as rated times above.

Scanner and Fax Specifications: MX310/MX410/MX51x/MX61x

Scanner	
Scanner Type	Color/Mono Flatbed Scanner with ADF
Scan Technology	MX310, MX410, MX51x: CIS MX61x: CCD
Light Source	LED
ADF Scanner	
Type	C-path
Duplex	Yes (<i>no duplex scanning on the MX310</i>)
Document Input & Output Capacity	50 Sheets, 20 lb. (75 g/m ²) Bond
Scanner Media Weight	Max: 32lb (120g/m ²) Min: 14lb (52g/m ²)
Scan Area	Max: Legal 8.5" x 14.0" (216mm x 356mm) SEF Min: A6 4.13" x 5.83" (105mm x 148mm) SEF
Maximum Resolution	Mono: 600 x 600 dpi Color: 600 x 600 dpi
Flatbed Scanner	
Scan Area	MX310/MX410: Max. Letter/A4 (216mm x 297mm) MX51x: Max. Legal 8.5" x 14" (216mm x 356mm) MX61x: Max. Legal 8.5" x 14" (216mm x 356mm)
Max Optical Resolution	Mono: 1200 dpi Color: 600 dpi
Max Resolution	Mono: 1200 x 600 dpi Color: 600 x 600 dpi
Fax	
Modem	Built-in Group 3 compatible, Full Function Fax 33,600bps, Max V.34 Half Duplex

ADF Scan Speed: MX310/MX410/MX51x/MX61x

Media Size	MX310dn		MX410de		MX510de, MX511dhe		MX610de, MX611de, MX611dhe	
	Simplex (SPM)	Duplex (SPM)	Simplex (SPM)	Duplex (SPM)	Simplex (SPM)	Duplex (SPM)	Simplex (SPM)	Duplex (SPM)
Letter	39	N/A	43	19	43	19	47	21
A4	39	N/A	41	18	41	18	45	20
Note: Scan Performance is measured using the 150dpi 8-bit for mono and 150dpi 24-bit for color.								

Time to First Copy (TTFC): MX310/MX410/MX51x/MX61x

				MX310	MX410	MX51x	MX61x
Input	Mode	Size	Copy Start State	Copy Time (in seconds)	Copy Time (in seconds)	Copy Time (in seconds)	Copy Time (in seconds)
ADF	Text/Photo	Letter	StandBy/Ready	6.8	6.5	6.5	6.5
Flatbed	Any	Letter	StandBy/Ready	6.5	6.5	6.5	6.5
ADF	Text/Photo	A4	StandBy/Ready	7.2	7.0	7.0	6.5
Flatbed	Any	A4	StandBy/Ready	6.5	8.1	8.1	6.5

NOTE: Time To First Copy, regardless of using the Flatbed or the ADF, is the amount of time from pressing the copy button until the printed copy sheet lands in the output bin.

Media Options: MX310/MX410/MX510/MX610

Options	
250-Sheet Tray	
550-Sheet Tray	
Stapler Option <small>* Available for the MX61x models only.</small>	
Swivel Cabinet	
Adjustable Printer Stand	

Note: Other than the furniture options above, no previous stands or carts are approved for use with the MX310, MX410, MX510 and MX610 Series MFPs only.

The authoritative tables of maximum Printer Paper Options/Furniture combinations are publicly available at www.lexmark.com/multifunctionprinters. Please refer to this information when purchasing additional paper input options for any of the MX310/MX410/MX510/MX610Series printers.

Theory of Operation

Electrophotographic Process

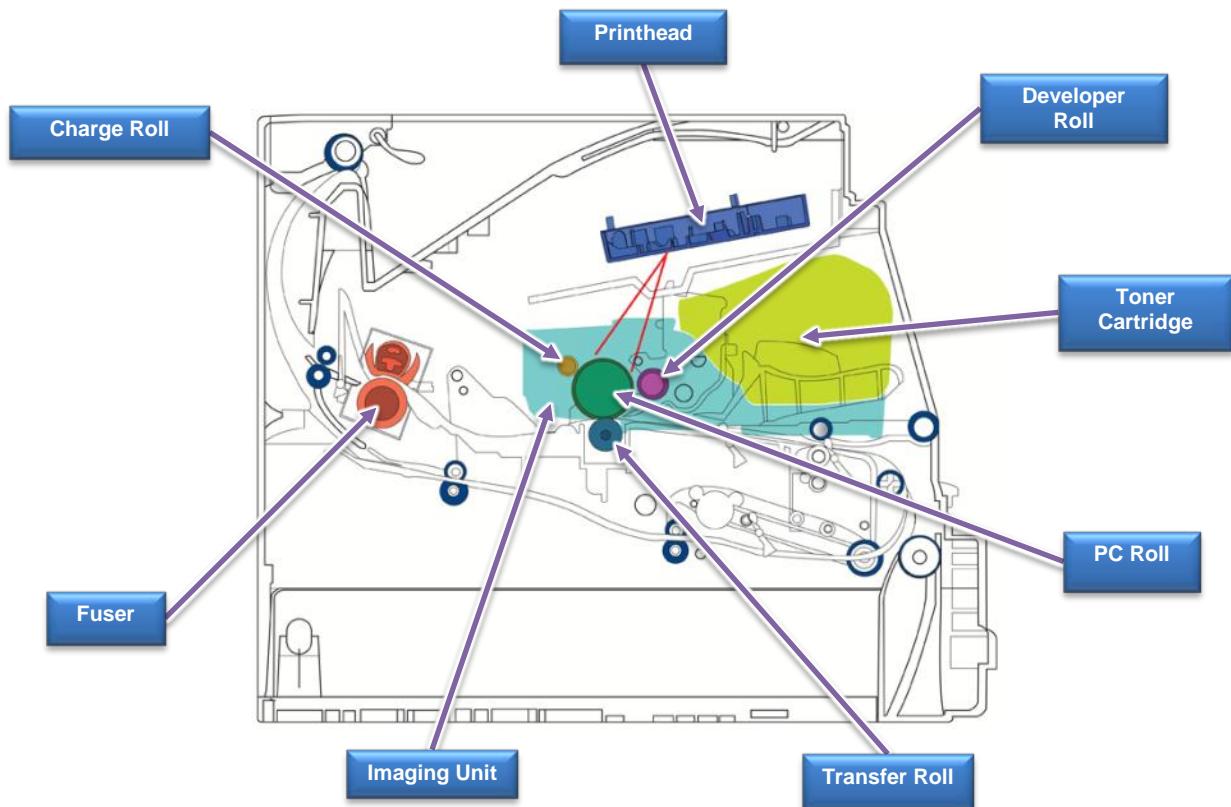
This monochrome laser printer uses the Electrophotographic Process (EP Process) to deliver high quality print at high speed.

The EP Process steps are as follows:

EP Step	Function
Charge	The charge roll deposits a uniform negative electrostatic charge on the light-sensitive surface of the photoconductor drum.
Expose	Laser light enters the cartridge and strikes the photoconductor (PC) drum in areas to be developed, forming an invisible (latent) electrostatic image of the desired print.
Develop	Once the laser exposes the photoconductor, the HVPS sends charge to the developer roll . Because of the charge difference between the toner on the developer roller and the electrostatic image created by the laser, the toner is attracted to areas of the photoconductor surface exposed by the laser.
Transfer	As the media travels between the transfer roll and the photoconductor, the transfer roll applies a positive charge to the back of the media. This positive charge attracts the negatively charged toner image from the photoconductor to the top surface of the media.
Fuse	The media – now with a “toned” image – moves through the fuser assembly . Using heat and pressure, toner is bonded permanently to the media.
Clean	The cleaning blade removes any toner that remains on the photoconductor after the transfer process. The toner removed is collected in the Imaging Unit’s waster toner bottle.

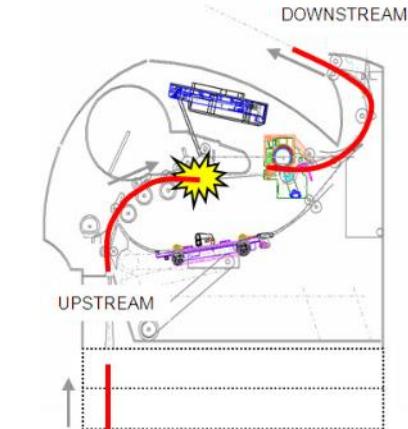
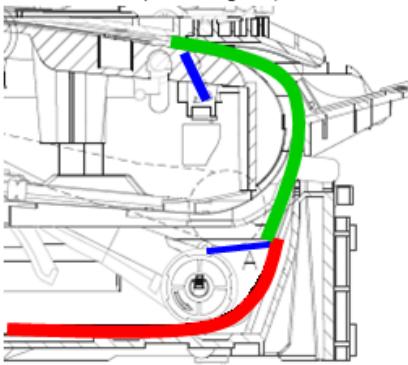
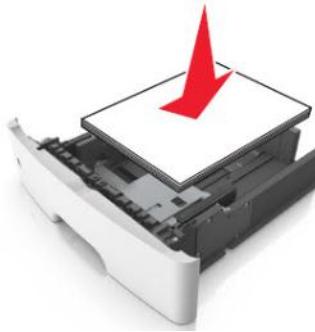
If a component fails, it is important to recognize at which step the failure took place. By knowing this, you can determine the source of the problem. Understanding the EP Process is the key to troubleshooting print quality problems.

EP Process Components Cross-Sectional



Paper Transport System and Enhancements

Base Engine Features and Updates

New Features	
<p>Flushing</p> <ul style="list-style-type: none"> This new feature will improve our customer's experience by minimizing user interventions when getting paper jams. The printer will attempt to automatically move undamaged media to the output bin that would have otherwise been jammed inside the printer, and will automatically resume printing. This feature is enabled by default. To disable, go to: General Settings > Print Recovery > Jam Assist > OFF/ON 	
<p>Jam Avoidance</p> <ul style="list-style-type: none"> With the implementation of a Trailing Edge (TE) sensor and new code algorithms, instances of getting "soft" jams and jams caused by gap closure can be reduced. The printer will now have the ability to hold off future picks: <ul style="list-style-type: none"> until it detects a gap between sheets until the previous sheet is past input sensor if the previous page is measured to be of unexpected length 	<p>TE Sensor does not detect gap (wait to pick)</p> 
<p>Tray Insert Design (MS510/MS610 and MX Series)</p> <ul style="list-style-type: none"> For the said printer models, the tray insert uses the lift plate mechanism to elevate the media during paper transport. The wear strips (aka dimple dams) is replaced with a new FRU part called the <i>separator roll assembly</i> which is part of the Maintenance Kit. Media should be fed straight in - no longer slanted. 	

Key Updates

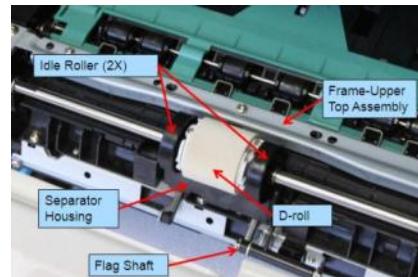
Multipurpose Feeder (MPF) Tray Design

- The MPF tray for this printer series also uses the lift plate mechanism.
- It can now hold up to a maximum of 100 sheets of media.
- The bail and pick tire cover are new FRU parts that will help improve customer's experience using the MPF tray.



MPF Pick Mechanism

- Now uses the Friction Separator Architecture.
- Parts included in the assembly are the following: D-roll, Idle Rollers, Separator Housing, Flag Shaft, Frame-Upper Top Assembly



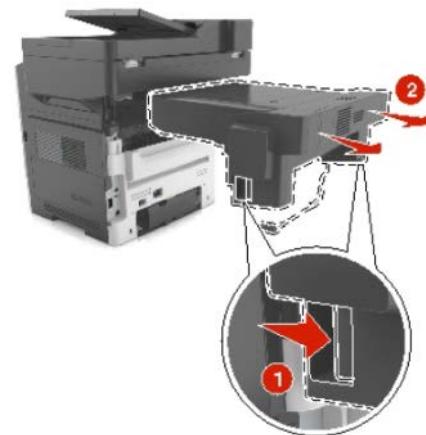
Input Option: Improved Tray Design

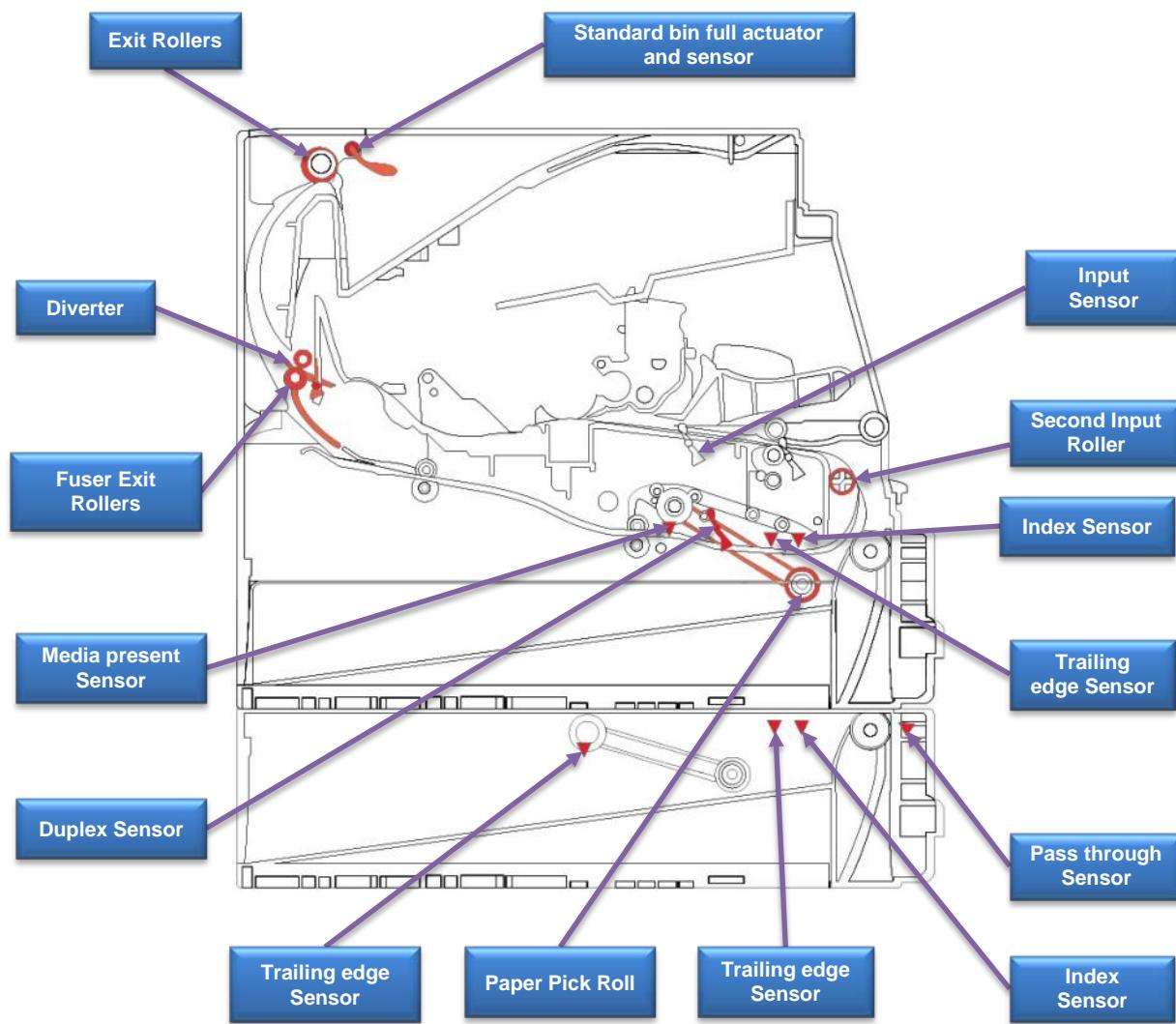
- For this series, the optional input trays now have FRU parts unlike the E series printers. With this new design, you don't have to replace the whole optional input tray when only the ACM or pick roller assembly is broken or needing replacement.
- A single optional tray is supported on the MS/MX310 & MS/MX410 models. Any combination of 550- and 250-sheet trays may be installed up to a total of 3 optional trays on the MS/MX510 and MS/MX610 models.



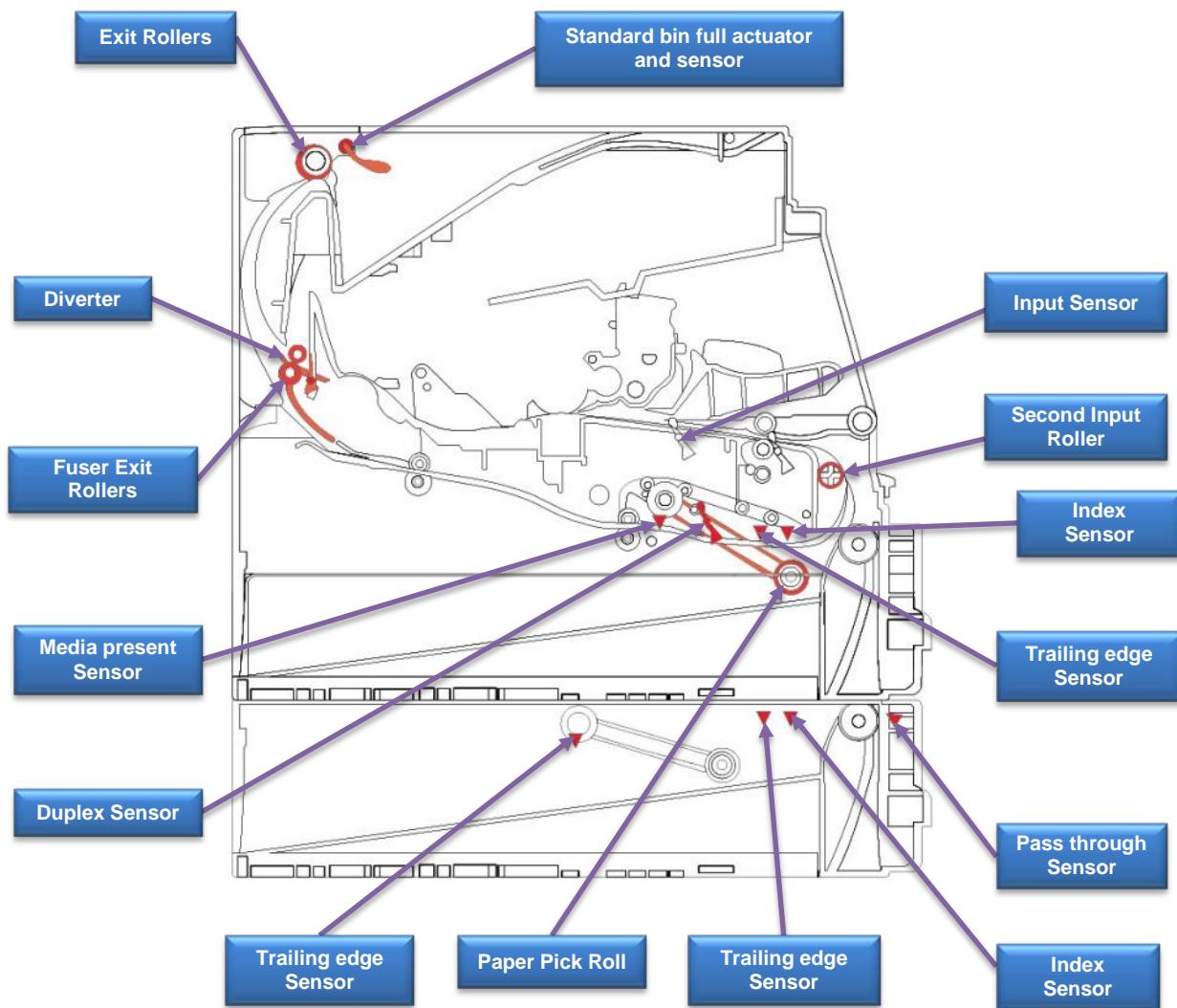
Output Option: Staple Finisher (MX61x only)

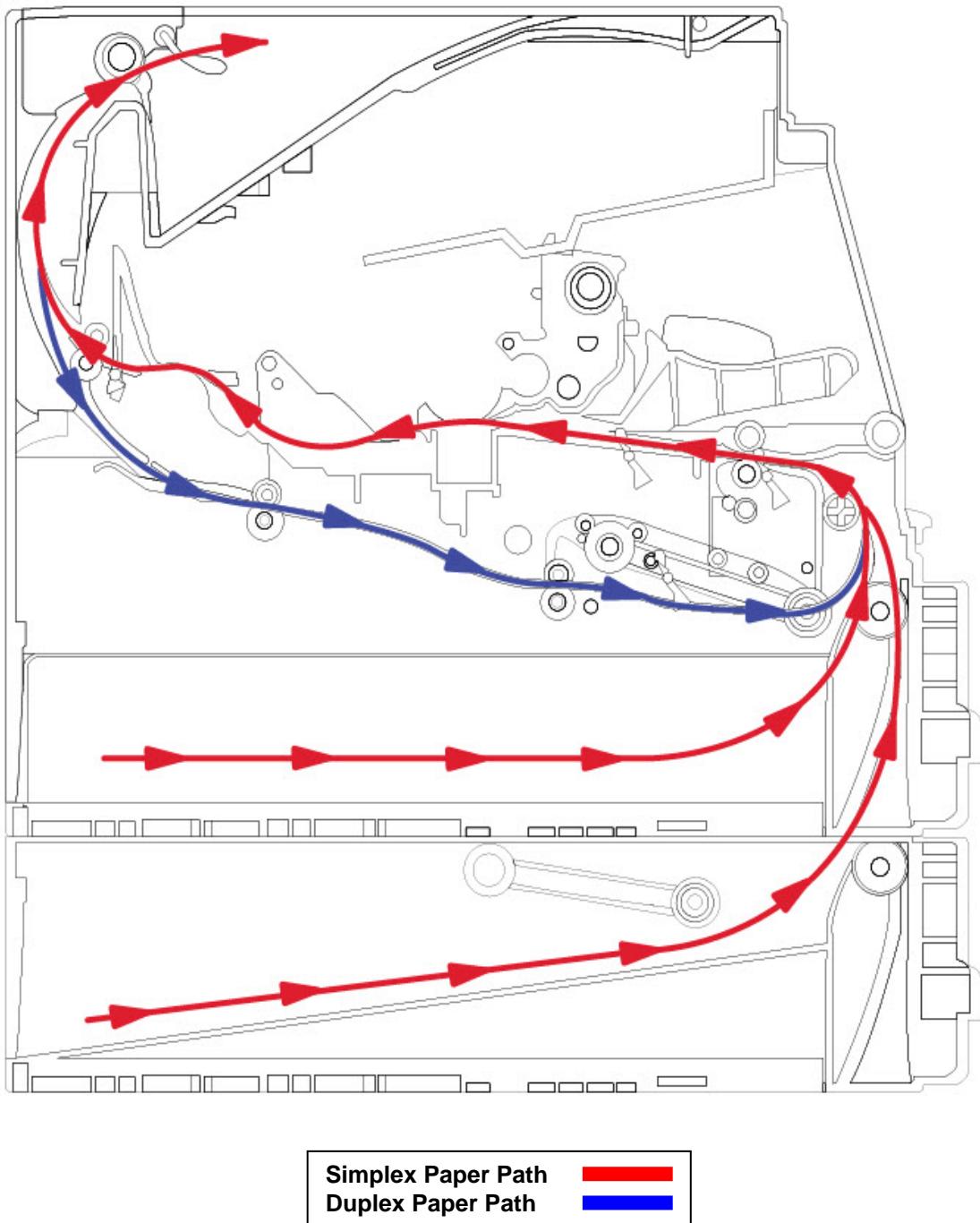
- The Staple Finisher is a compact, modular, finishing solution which offers single-position stapling for A4, letter, legal, Folio and Oficio paper sizes, stapling from 2 sheets to 20 sheets per set (20 lb., 75 g/m²).
- It has staple low/empty sensor to indicate when the staple supply is low as well as when staples run out. The staple cartridge contains 1,000 staples.
- It does not have a dedicated output bin; it shares the same output bin as the base printer.
- It has its own power supply which is designed to be a customer installable part.

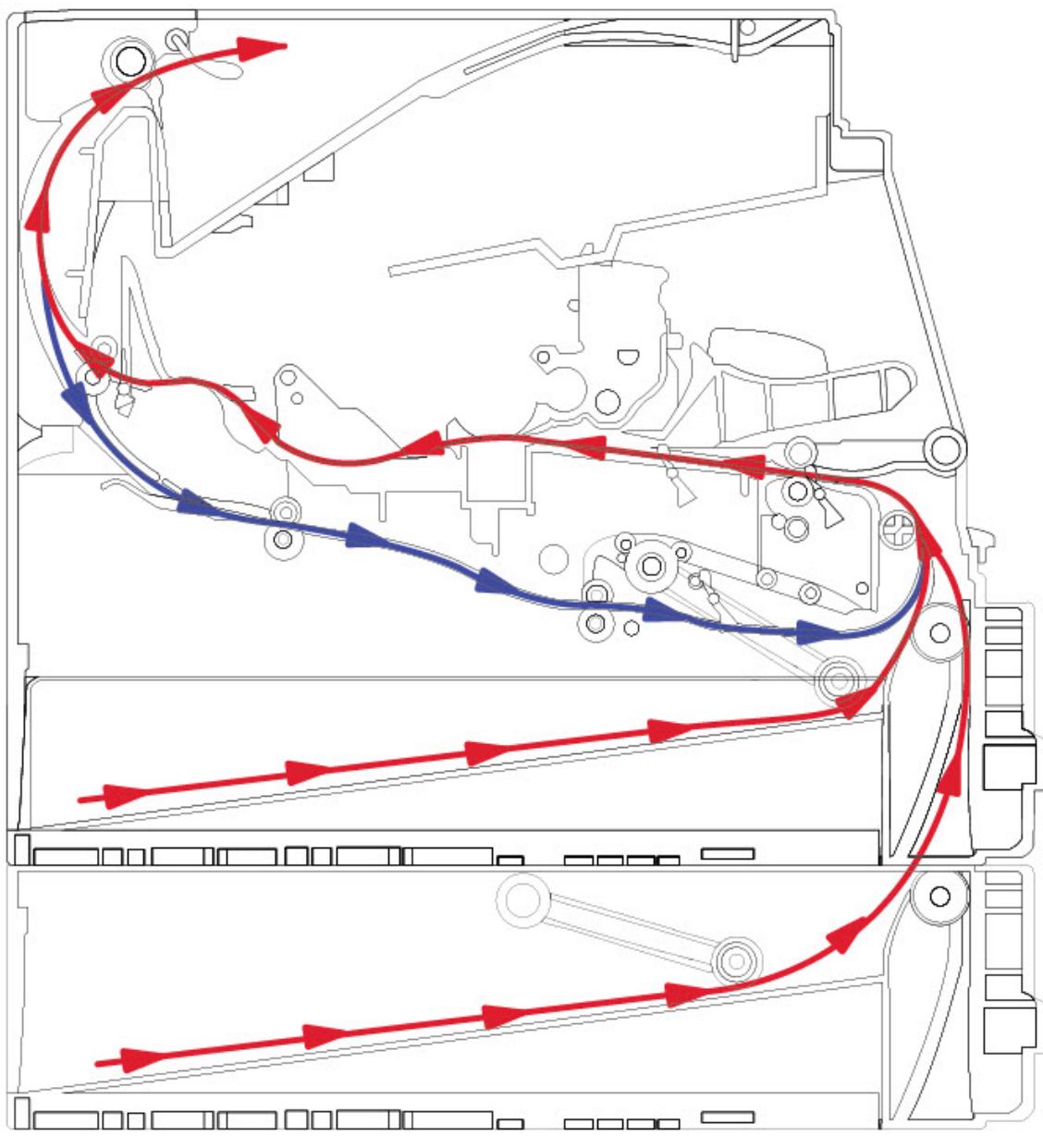


Paper Transport System Key Components: MS310/MS312/MS315/MS410/MS415

Paper Transport System Key Components: MS510/MS610 and MX310/MX410/MX51x/MX61x

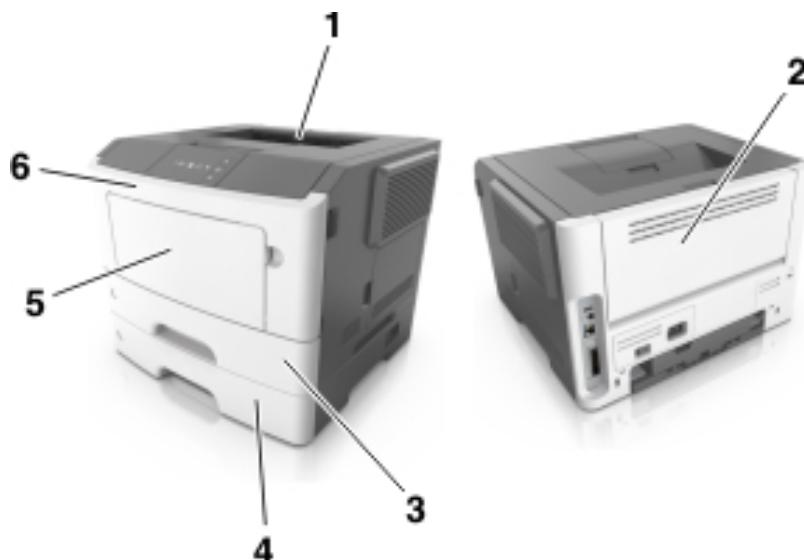


Print Engine Paper Path: MS31x//MS41x and MX310/MX410 Series

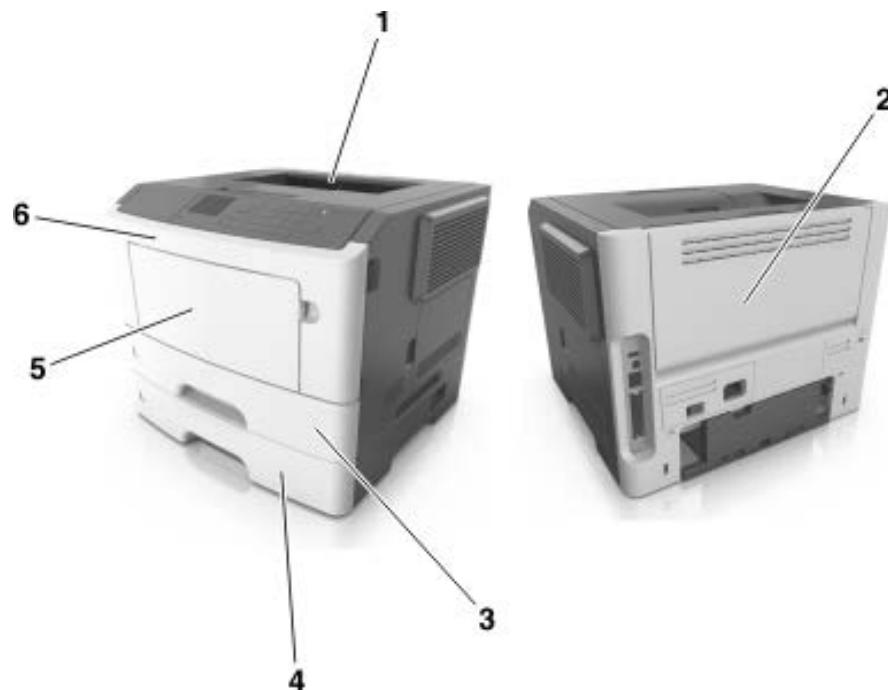
Print Engine Paper Path: MS510/MS610 and MX510/MX610 Series

Simplex Paper Path

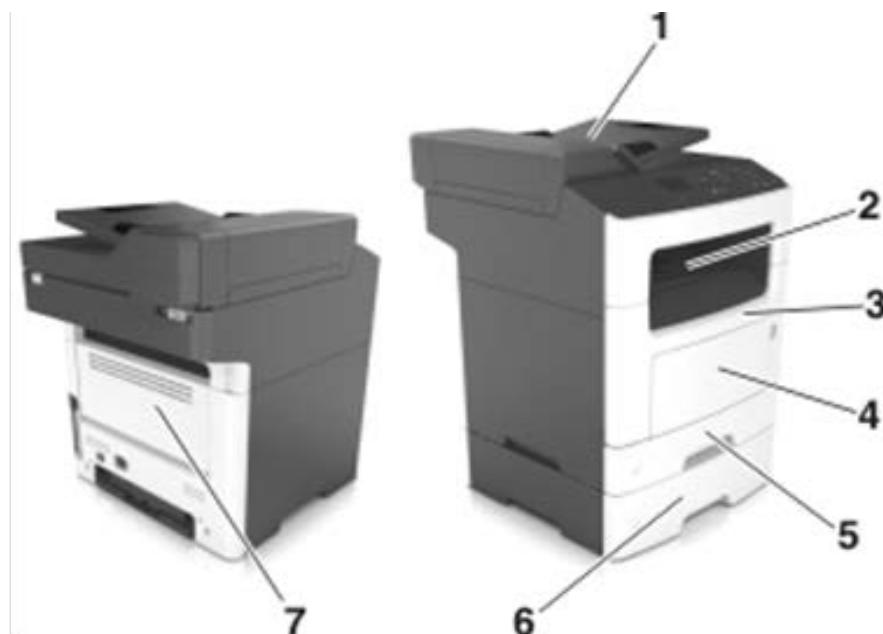
Duplex Paper Path

Paper Jam Locations: MS310/MS312/MS315/MS410/MS415

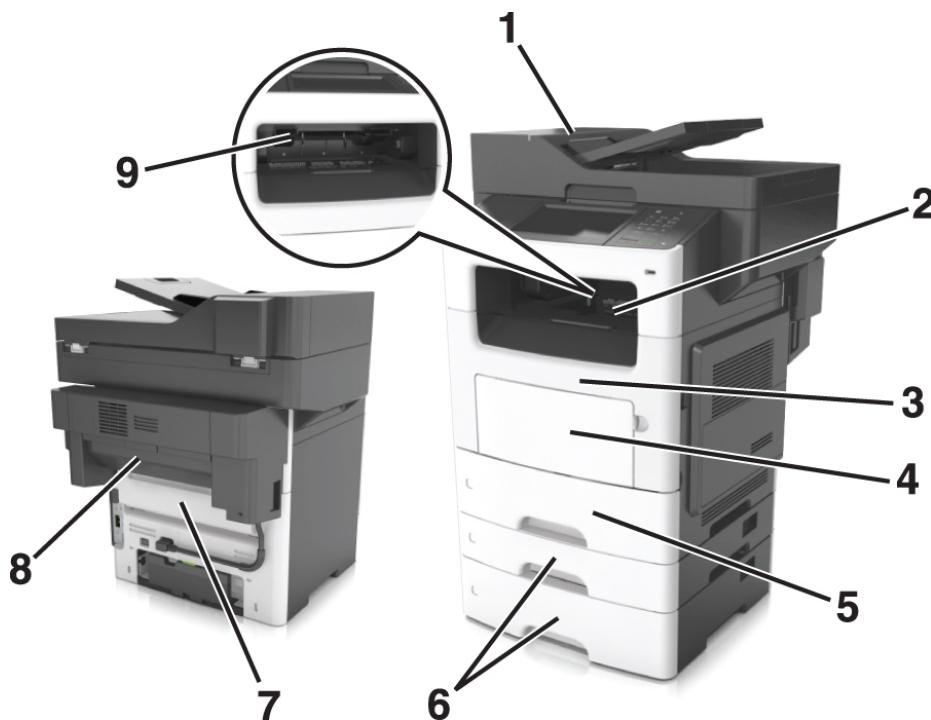
#	Description
1	Standard bin
2	Rear door
3	Standard 250-sheet tray (Tray 1)
4	Optional 250- or 550-sheet tray (Tray 2)
5	Multipurpose feeder door
6	Front door

Paper Jam Locations: MS510/MS610 Series

#	Area	Error Message
1	Standard bin	Clear standard bin. [20y.xx]
2	Rear door	Open rear door. [20y.xx]
3	Tray 1	Remove tray 1 to clear duplex. [23y.xx]
4	Tray [x]	Remove tray [x]. [24y.xx]
5	Multipurpose feeder	Clear manual feeder. [250.xx]
6	Front door	Open front door. [20y.xx]

Paper Jam Locations: MX310/MX410/MX51x

#	Area	Error Message
1	Auto Document Feeder (ADF)	Open ADF to clear jam. [28y.xx]
2	Standard bin	Clear standard bin. [20y.xx]
3	Front door	Open front door. [20y.xx]
4	Multipurpose feeder	Clear manual feeder. [250.xx]
5	Tray 1	Remove tray 1 to clear duplex. [23y.xx]
6	Tray [x]	Remove tray [x]. [24y.xx]
7	Rear door	Open rear door. [20y.xx]

Paper Jam Locations: MX61x

#	Area	Error Message
1	ADF	Open ADF to clear jam. [28y.xx]
2	Standard bin	Clear standard bin. [20y.xx]
3	Front door	Open front door. [20y.xx]
4	Multipurpose feeder	Clear manual feeder. [250.xx]
5	Tray 1	Remove tray 1 to clear duplex. [23y.xx]
6	Tray [x]	Remove tray [x]. [24y.xx]
7	Rear door	Open rear door. [20y.xx]
8	Finisher rear door	Remove all pages from the finisher's accumulator. Leave paper in bin [45y.xx]
9	Finisher output bin	Remove all pages from the output bin. Leave paper in bin [45y.xx]

Scanner System: MX310/MX410/MX510/MX610

The document scanning section consists of a scanner that reads a single-sheet document placed on the flatbed glass and an Auto Document Feeder (ADF) that can read the pages of a multiple-sheet and/or duplexed document.

ADF Theory of Operation

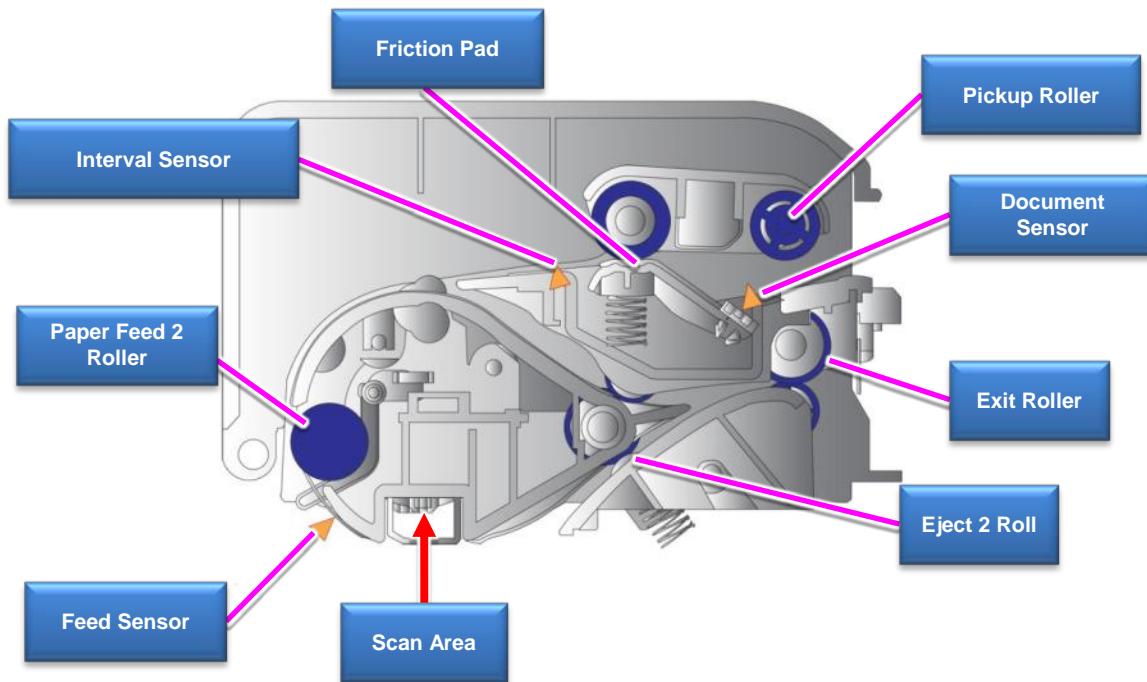
A duplex ADF enables the user to create duplex scans automatically thus eliminating the need to manually flip the document. The ADF uses DC motors with encoder wheels and a series of sensors to determine the position of the media in the paper path during the scan process.

The following steps are performed in creating a duplex scan on a duplex ADF.

Step	Function
1	The scanner control unit (on the controller board) receives a command to create a scan, fax, or copy.
2	A signal is sent to the ADF to poll the document sensor to check if the media to be scanned is in the correct position. Media must be placed in the ADF input tray so it actuates the document sensor. If the ADF document sensor isn't actuated, a flatbed scan is run by default.
3	If the media actuates the document sensor, then an ADF scan is executed. At this point, the pickup roller on the pick arm assembly drops and advances the paper into the ADF. To minimize the possibility of multiple sheets being fed, the ADF uses a separator roll that counter-rotates against the feed direction. After passing the pick assembly, the media actuates the stage and interval sensors. Actuating these sensors indicates this will be the first side of the document to be scanned.
4	The stage sensors are used to determine and correct document skew if it is present. If the stage sensors actuate at different times, the paper is slowly fed to the paper feed 1 roller. The feed motor encoder wheel count tracks the paper location in the paper path.
5	The paper feed 1 roller is stationary and acts as a registration roll which causes the paper to de-skew.
6	When the encoder count reaches a certain point, the paper feed 1 roller advances the de-skewed paper to the paper feed 2 roller and feed sensor. If the paper does not actuate the feed sensor before the pre-determined encoder count is attained, a paper jam error is generated.
7	When the feed sensor actuates, the paper advances to the scan area. While the paper is advancing to the scan area, the DC motor encoder generates a count which is stored in an on-board counter. These counters, in conjunction with the feed sensor, ensure the media is travelling at the correct speed through the scan area. The speed of the document through the ADF scan area is dependent on the image DPI which is specified by the user.
8	After a predetermined number of counts, the media reaches the scan area and the image acquisition process is initiated. While the image acquisition process is executing, the feed sensor is polled to determine if the trailing edge of the media has reached the sensor.

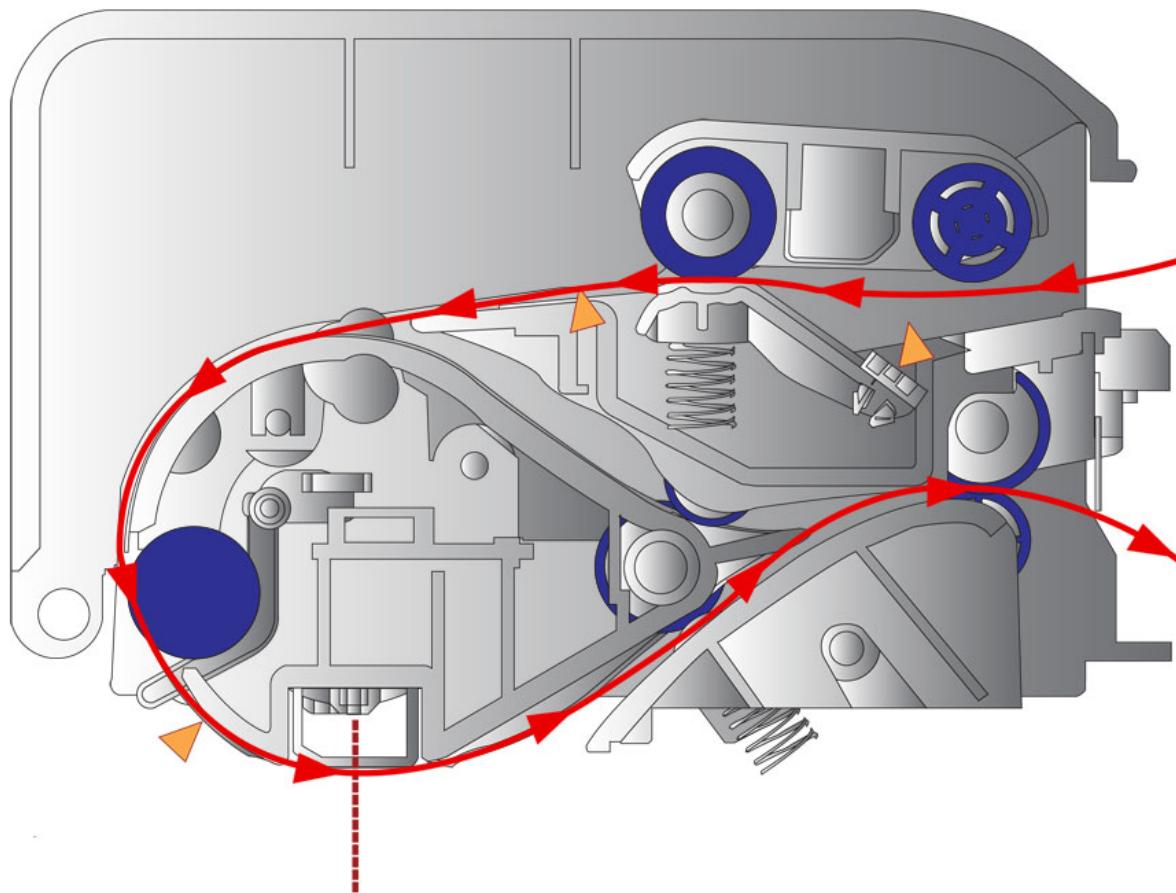
Step	Function
9	Once the trailing edge of the scan media reaches the feed sensor, the sensor switches off. Once off, the image acquisition process continues for a predetermined length of time.
10	When the image acquisition process completes, the trailing edge of the media continues to the reverse point. If the scan job is simplex, the media advances to the exit roller and exits the ADF.
11	If the scan job is duplex, however, the feed motor reverses with a swing gear as the trailing edge of the media reaches the reverse point. The swing gear moves the diverter gate to the down position.
12	The reversed exit roll pulls the paper back into the ADF. The eject 2 roll moves the media to the duplex sensor. Once the duplex sensor actuates, it signals the control board that this is the second side of the media to be scanned and the exit roll stops rotating.
13	After the media actuates the duplex sensor, the eject 2 roll moves the media to the paper feed 1 roll and the feed sensor. Like the first pass of the media, the image acquisition process is repeated for the second side of the media.
14	When the trailing edge of the media reaches the reverse point the second time, the swing gear moves the diverter gate to the down position and exit roll reverses. The paper moves back into the ADF unit for a third time. The paper passes through the paper path, but no imaging occurs. This pass turns the paper over to the original side up. On the third pass of the media trailing edge over the reverse point, the eject two roller does not reverse and the paper passes out of the ADF.

ADF Key Components: MX310



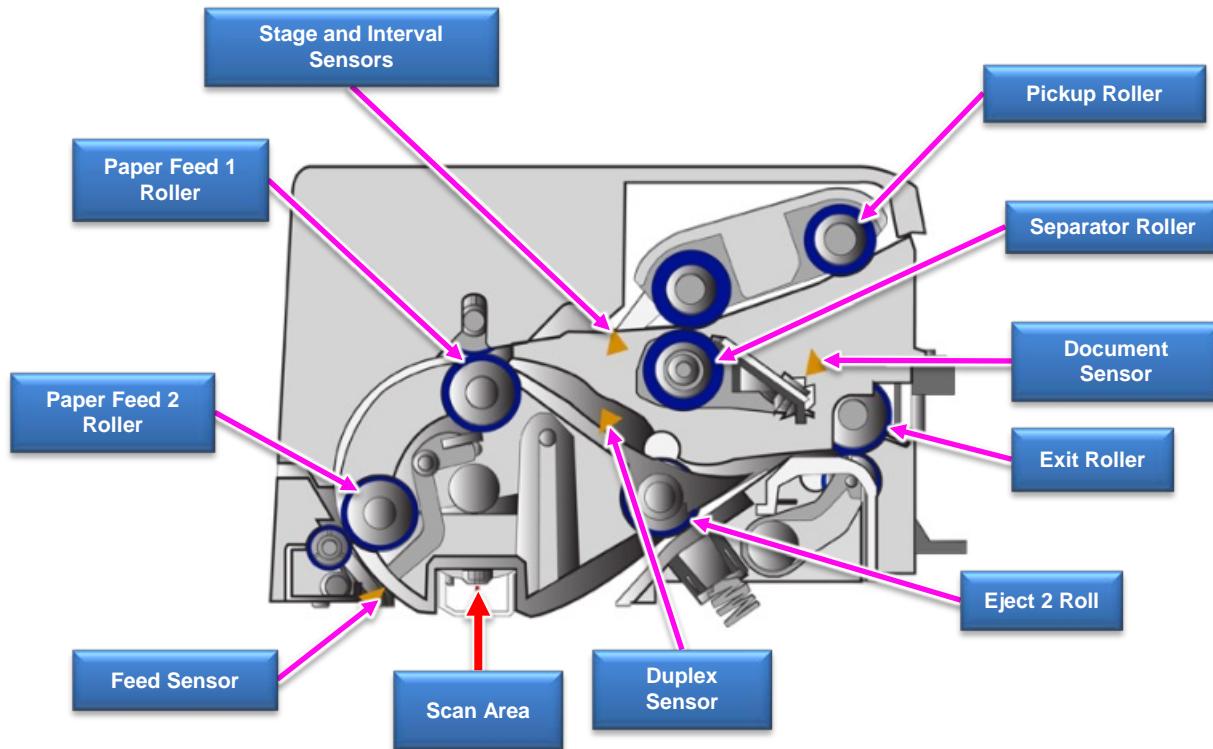
ADF Key Components Table: MX310

Component	Function
Document Sensor	Determines the first side of the document to be scanned and signals the flatbed Carriage Motor to move the CCD Imaging Unit to the ADF scan area.
Pickup Roller	Feeds the media into the ADF.
Friction Pad	Keep multiples sheets of paper from feeding.
Interval Sensor	Indicates the trailing edge of the page so that the next page can be picked as soon as possible.
Paper Feed 2 Roller	Advances the media to the Scan Area.
Feed Sensor	If the paper does not reach the Feed Sensor before a certain encoder count is attained, a 28x.xx paper jam error is generated.
Scan Area	The media is scanned by the CCD and image acquisition takes place.
Eject 2 Roll	Pushes the media toward the Exit Rollers
Exit Roller	Pushes the media into the bin.

ADF Paper Path: MX310

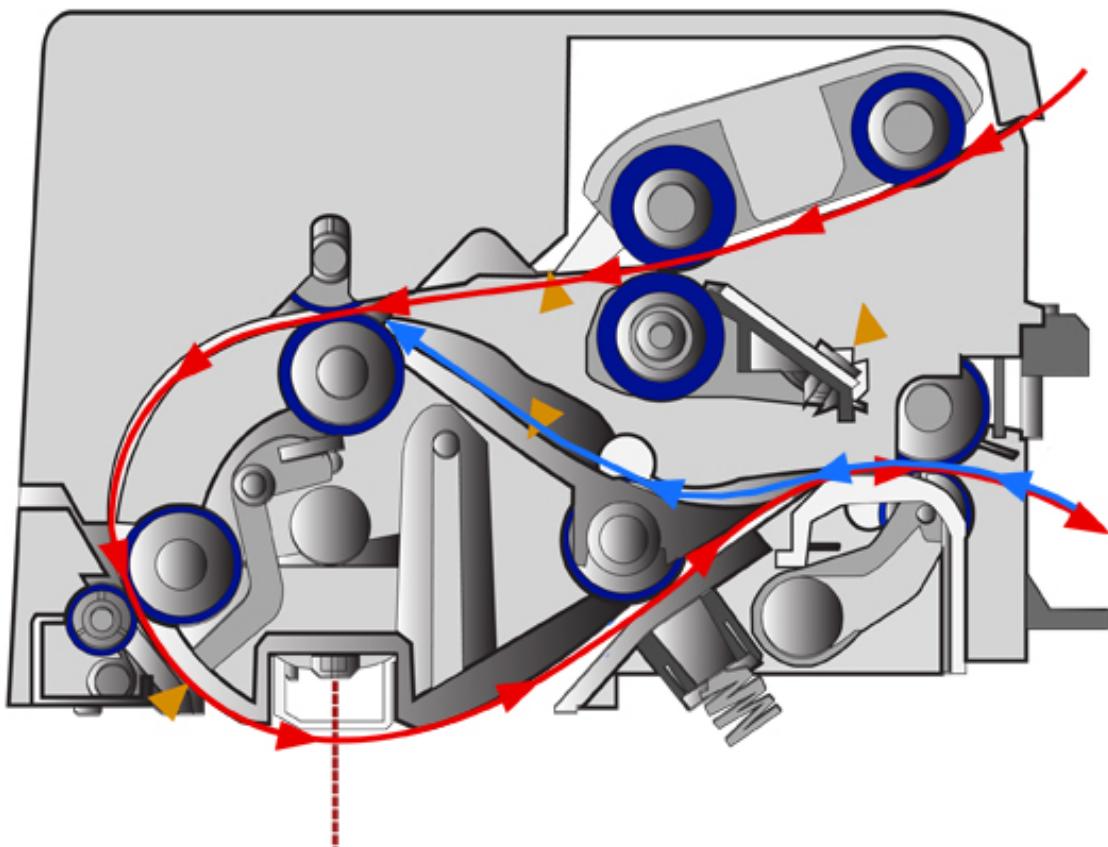
Simplex Paper Path

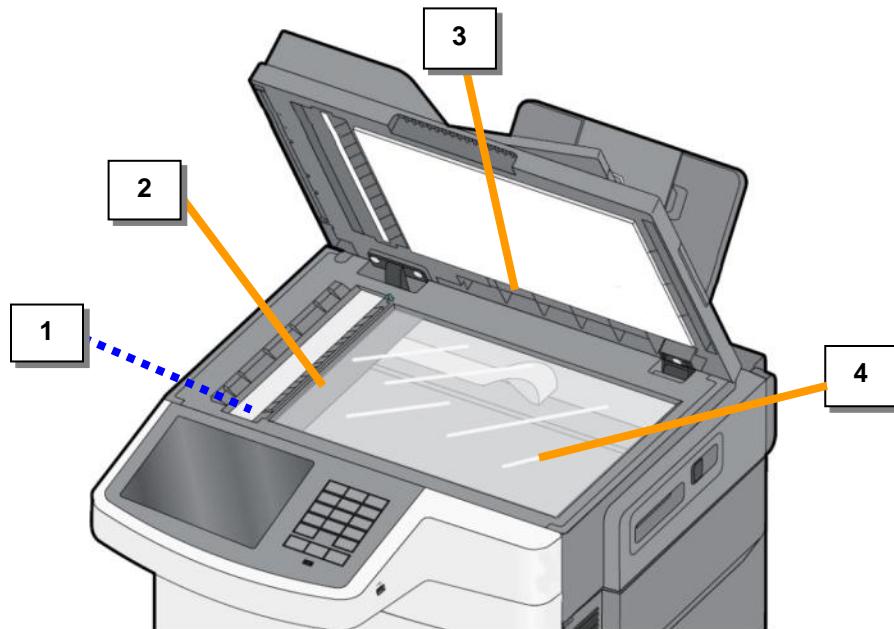
ADF Key Components: MX410/MX51x/MX61x



ADF Key Components Table: MX410/MX51x/MX61x

Component	Function
Document Sensor	Determines the first side of the document to be scanned and signals the flatbed Carriage Motor to move the CCD Imaging Unit to the ADF scan area.
Pickup Roller	Feeds the media into the ADF.
Separator Roller	Counter rotates against the Pickup Roller to keep multiple sheets of paper from feeding.
Stage and Interval Sensors	Actuating these sensors tells the ADF that this is the first side of the document to be scanned. In addition, The Stage Sensor determines and corrects skew in the media.
Paper Feed 1 Roller	Acts as a registration roller to correct skew in the media. After a certain count (determined by the feed motor encoder), the roller rotates and advances the media to the Paper Feed 2 Roller and Feed Sensor.
Paper Feed 2 Roller	Advances the media to the Scan Area.
Feed Sensor	If the paper does not reach the Feed Sensor before a certain encoder count is attained, a 28x.xx paper jam error is generated.
Scan Area	The media is scanned by the CCD and image acquisition takes place.
Duplex Sensor	Shines light onto the document (LED).
Eject 2 Roll	On a duplex scan, helps pull the media back into the ADF toward the Duplex Sensor.
Exit Roller	Pushes the media into the bin. If the job is duplex, the roller reverses and pulls the media back into the duplex toward the Eject 2 Roll.

ADF Paper Path: MX410/MX51x/MX61x

Flatbed Key Components: MX310/MX410/MX51x/MX61x

Number	Component	Function
1 (Hidden)	Scanner Home Position Sensor	Detects the registration position of the scanner.
2 (Hidden)	CCD Imaging Unit	Shines light onto the document (LED).
3	ADF Open Sensor	Detects if the ADF lid is open.
4	Flatbed Glass	Glass surface where the document is scanned.

Control Panel and Menus

MS310d/dn Control Panel

The MS310 printer model has 6 LEDs and 3 buttons.



Buttons and Functions

Part	Description	Color	Function
!	Error light	Yellow	An error has occurred.
⋮	Paper jam light	Yellow	A paper jam has occurred.
📄	Load or remove paper light	Yellow	Paper must be loaded in the tray or removed from the bin.
🖨️	Toner low or replace imaging unit light	Yellow	The toner cartridge is low on toner, or the imaging unit needs to be replaced.
💡	Ready or data light	Green	The printer is in Ready state.
▷	Start button and light	Green	Use this to initiate a print job.
✗	Stop button	Red	Stop all printer activity.
🌙	Sleep button and light	Amber	Use this to enable Sleep mode or Hibernate mode.

Administrative Menu: MS310d/dn

For a complete listing of the printer menu tree, consult the User's Guide.

You may print a menus list by printing the menu settings and network setup pages. Access the menus from a network printer by using the Embedded Web Server. If your printer is connected by USB or parallel cable, then access the menus using the Local Printer Settings Utility for Windows or Printer Settings for Macintosh.

MS310d/dn Administrative (Customer) Menu Tree

Paper Menu	Settings	Network/Ports Security	Security
Default Source	General Settings	USB	Set Date and Time
Paper Size/Type	Print Settings		
Configure MP			
Paper Texture			
Paper Weight			
Paper Loading			
Custom Types			

Service Menus: MS310

Several hidden menus exist to configure advanced settings, troubleshoot problems or obtain additional printer information. The settings contained in these menus **should not be changed** unless it is specifically requested by the Service Manual or Technical Support. Changing the settings may cause improper operation of the printer.

For a complete list of these menus, consult the Service Manual for the printer.

Diagnostics Mode	<p>To enter the Diagnostic Menu, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold . 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>The Diagnostics Menu contains advanced settings and operations used for repair, adjustments or other diagnostic actions.</p>
Configuration Menu	<p>To enter Configuration Menu, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold . 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>The Configuration Menu contains a set of menus, settings and operations that are used to configure a printer for operation.</p>
Invalid Engine Code	<p>To enter the Invalid Engine Code state, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold  and . 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>This state allows you to POR the printer into a mode that disables the Engine Code and allows the programming of new code into the Engine card.</p> <p>Typically this function is used to reprogram defective Engine code but can be useful in other applications.</p>
Recovery Mode	<p>To enter Recovery Mode, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold . 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>NOTE: Recovery Mode only available on non-eTask printers.</p> <p>This mode will allow the printer to boot from a secondary set of instructions to allow a code flash to the printer.</p> <p>While in this mode, you can ONLY flash code via USB directly connected to a PC.</p>

SE Menu	From a browser, add “/se” to the device IP address. (Example: http://158.183.3.2/se)	Capture diagnostic and debug data.
Safe Mode	Enabled through NPA Command	<ul style="list-style-type: none">• An NPA command can be issued to enable Safe Mode.• If the Safe Mode setting is changed via NPA command, the device must be POR'ed for the new setting to take effect.

MS312dn and MS410d/dn Control Panel

The MS410 Series models have a 2-line 128 x 32 pixel All Points Addressable (APA) monochrome LED display with 7 tactile buttons and two LEDs (1 indicator LED and 1 LED located under the "Sleep" button).



Buttons and Functions

Part	Description	Function
	Display	View printing options as well as status and error messages.
	Menus button	Open the menus. <ul style="list-style-type: none"> The menus are available only when the printer is in the Ready state. Pressing the button while navigating within the menus returns the Control Panel to the top-level menu screen.
	Indicator Light	Determine the status of the printer.
	Back button	Return to the previous screen.
	Left and Right arrow buttons	<ul style="list-style-type: none"> Scroll through menus or to move between screens and menu options. Scroll through settings or text. For menus with numeric values, press and hold an arrow button to scroll through the settings. Release the button when the value you want appears.
	Select button	<ul style="list-style-type: none"> Open a menu. Display available values or settings for a menu. The current default setting is indicated by an asterisk (*). Save the displayed value as the new user default setting.
	Stop button	<ul style="list-style-type: none"> Exit the menus and return to the Ready state. Stop printer activities, such as printing or downloading fonts.
	Sleep button	Enable Sleep Mode or Hibernate Mode. <ul style="list-style-type: none"> Pressing any hard button will cause the printer to wake from Sleep mode. Pressing the Sleep button or the power switch will cause the printer to wake from Hibernate mode.

Administrative Menu: MS312dn and MS410d/dn

For a complete listing of the printer menu tree, consult the User's Guide.

MS410d/dn Administrative (Customer) Menu Tree

Paper Menu	Reports	Network/Ports ³	Settings
Default Source	Menu Settings Page	Active NIC	General Settings
Paper Size/Type	Device Statistics	Standard Network ²	Print Settings
Configure MP	Network Setup Page ¹	Reports	
Substitute Size	Profiles List	Network card	
Paper Texture	Print Fonts	TCP/IP	
Paper Weight	Print Directory	IPv6	
Paper Loading	Asset Report	Wireless	
Custom Types		AppleTalk	
Universal Setup		Standard USB	
		SMTP Setup	

Security

- Security Audit Log
- Set Date and Time

¹ Depending on the printer setup, this menu item appears as Network Setup Page or Network [x] Setup Page.

² Depending on the printer setup, this menu item appears as Standard Network or Network [x].

³ The menu items in this menu appear only in network printers or printers connected to print servers.

Service Menus: MS312dn and MS410d/dn

Several hidden menus exist to configure advanced settings, troubleshoot problems or obtain additional printer information. The settings contained in these menus **should not be changed** unless it is specifically requested by the Service Manual or Technical Support. Changing the settings may cause improper operation of the printer.

For a complete list of these menus, consult the Service Manual for the printer.

Diagnostics Mode	To enter the Diagnostic Menu , do the following: 1. Turn off the printer. 2. Press and hold and . 3. Turn on the printer. 4. Release the buttons when the splash screen appears.	The Diagnostics Menu contains advanced settings and operations used for repair, adjustments or other diagnostic actions.
Configuration Menu	To enter Configuration Menu , do the following: 1. Turn off the printer. 2. Press and hold and . 3. Turn on the printer. 4. Release the buttons when the splash screen appears.	The Configuration Menu contains a set of menus, settings and operations which are infrequently required by a user. Generally, the options made available in this menu group are used to configure a printer for operation.
Invalid Engine Code	To enter the Invalid Engine Code state, do the following: 1. Turn off the printer. 2. Press and hold . 3. Turn on the printer. 4. Release the buttons when the splash screen appears.	This state allows you to POR the printer into a mode that disables the Engine Code and allows the programming of new code into the Engine card. Typically this function is used to reprogram defective Engine code but can be useful in other applications.
Recovery Mode	To enter Recovery Mode , do the following: 1. Turn off the printer. 2. Press and hold and . 3. Turn on the printer. 4. Release the buttons when the splash screen appears.	NOTE: Recovery Mode only available on non-eTask printers. This mode will allow the printer to boot from a secondary set of instructions to allow a code flash to the printer. While in this mode, you can ONLY flash code via USB directly connected to a PC.
SE Menu	From a browser, add “/se” to the device IP address. (Example: http://158.183.3.2/se)	Capture diagnostic and debug data.
Safe Mode	To Enable or Disable Safe Mode , do the following:	<ul style="list-style-type: none"> Safe Mode state will not disable on POR without holding down the

	<ol style="list-style-type: none">1. Turn off the printer.2. Press and hold  and .3. Turn on the printer. <p>Release the buttons when the splash screen appears.</p> <p>***** OR *****</p> <p>Go to Configuration Menu:</p> <ol style="list-style-type: none">1. Turn off the printer.2. Press and hold  and .3. Turn on the printer.4. Go to Safe Mode Menu5. Select ON/OFF6. POR the printer to take effect	<p>special button sequence.</p> <ul style="list-style-type: none">• Safe Mode can co-exist with other POR button sequence modes, such as Config and Diagnostics.• Safe Mode can also be managed through the Config menu via the Safe Mode menu. If the Safe Mode setting is changed on this menu, the device must be POR'ed for the new setting to take effect.
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MS315dn/MS415dn/MS510dn Control Panel



2.4 inch QVGA color LCD graphical user interface

21 tactile buttons including the "Sleep" button

4 navigational arrows

Two LEDs (1 indicator LED below the 2.4 inch panel and 1 LED located under the "Sleep" button)

MS610dn Control Panel



The MS610dn Control Panel looks the same as the MS510dn printer but with a front USB-A port.

The following page contains a detailed description of the Control Panel buttons and their functions.

Buttons and Functions: MS315dn/MS415dn/MS510dn and MS610dn

Part	Description	Function
	Display	View the printer status and messages. Set up and operate the printer.
	Keypad	Enter numbers, letters, or symbols.
	Arrow buttons	Scroll through the menus.
	Select button	Select menu options. Save settings.
	Indicator Light	Determine the status of the printer.
	Home button	Go to the home screen.
	Back button	Return to the previous screen.
	Sleep button	Enable Sleep Mode or Hibernate Mode . The following actions wake the printer from Sleep mode: <ul style="list-style-type: none">• Pressing any hard button• Opening a tray or the front door• Sending a print job from the computer• Performing a power-on reset using the main power switch• Attaching a device in the USB port
	Stop button	Stop all printer activities.
	USB port¹	Connect a flash drive to the printer. Notes: <ul style="list-style-type: none">• Only the front USB port supports flash drives.• This feature is available only in select printer models.

¹Only available for the MS610dn printer model.

Administrative Menu: MS315dn/MS415dn/MS510dn and MS610dn

For a complete listing of the printer menu tree, consult the User's Guide.

MS510dn/MS610dn Administrative (Customer) Menu Tree

Paper Menu	Reports	Network/Ports
Default Source	Menu Settings Page	Active NIC
Paper Size/Type	Device Statistics	Standard Network ³
Configure MP	Network Setup Page ²	Reports
Substitute Size	Profiles List	Network Card
Paper Texture	Print Fonts	TCP/IP
Paper Weight	Print Directory	IPv6
Paper Loading	Print Demo	Wireless
Custom Types	Asset Report	AppleTalk
Custom Names ¹		Standard USB
Universal Setup		Parallel ⁴
		SMTP Setup

Security	Settings	Help
Miscellaneous Security Settings ⁴	General Settings	Print All Guides
Confidential Print	Flash Drive Menu ⁴	Print Quality
Disk Wiping ⁴	Print Settings	Media Guide
Security Audit Log		Print Defects Guide
Set Date and Time		Menu Map
		Information Guide
		Connection Guide
		Moving Guide
		Supplies Guide

¹ This menu appears only in touch screen printer models.

² Depending on the printer setup, this menu item appears as Network Setup Page or Network [x] Setup Page.

³ Depending on the printer setup, this menu item appears as Standard Network or Network [x].

⁴ This feature is available only in select printer models.

Service Menus: MS315dn/MS415dn/MS510dn and MS610dn

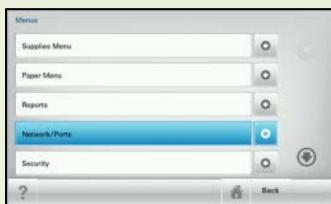
For a complete list of these menus, consult the Service Manual for the printer.

Diagnostics Mode	<p>To enter the Diagnostic Menu, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 3 and 6. 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>The Diagnostics Menu contains advanced settings and operations used for repair, adjustments or other diagnostic actions.</p>
Configuration Menu	<p>To enter Configuration Menu, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 2 and 6. 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>The Configuration Menu contains a set of menus, settings and operations which are infrequently required by a user.</p> <p>Generally, the options made available in this menu group are used to configure a printer for operation.</p>
Network SE Menu	<p>To enter the Network SE Menu, do the following:</p> <ol style="list-style-type: none"> 1. Enter Network/Ports>Standard Network>Std Network Setup menu. 2. Press and hold 6, 7 and 9. 3. Release the buttons when the Network SE Menu appears. 	<p>You do not POR the machine to access this menu.</p>
SE Menu	<p>From a browser, add “/se” to the device IP address. (for example: http://158.183.3.2/se)</p>	<p>Capture diagnostic and debug data.</p>
Invalid Engine Code	<p>To enter the Invalid Engine Code state, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 3, 4 and 6. 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>This state allows you to POR the printer into a mode that disables the Engine Code and allows the programming of new code into the Engine card.</p> <p>Typically this function is used to reprogram defective Engine code but can be useful in other applications.</p>

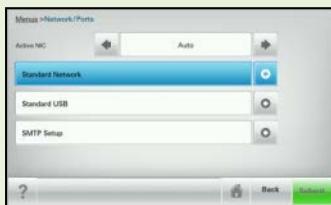
Recovery Mode	<p>To enter Recovery Mode, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 2, 7 and 8. 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>NOTE: Recovery only available on non-eTask printers.</p> <p>This mode will allow the printer to boot from a secondary set of instructions to allow a code flash to the printer. No other functions are available. The screen will have a red background and say "Recovery".</p> <p>While in this mode, you can ONLY flash code via USB directly connected to a PC.</p>
Safe Mode	<p>To Enable/Disable Safe Mode, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 6 and 7. 3. Turn on the printer. <p>Release the buttons when the splash screen appears.</p> <p style="text-align: center;">***** OR *****</p> <p>Go to Configuration Menu:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 2 and 6. 3. Turn on the printer. 4. Go to Safe Mode Menu 5. Select ON/OFF 6. POR the printer to take effect 	<p>NOTE: Only available for printers with a code level of EC1 or greater.</p> <p>Allows print operations to be used even if a non-critical subsystem failure occurs. When configured in Safe Mode, the device operates in a minimal/base function state for print operations, permitting a customer to continue printing until service can be arranged to repair the device. Safe Mode is designed to be a short-term solution.</p> <ul style="list-style-type: none"> • Safe Mode state will not disable on POR without holding down the special button sequence. • Safe Mode can co-exist with other POR button sequence modes, such as Config and Diagnostics.

Network SE Menu

1. In the Administration (Customer) Menu, select the Network/Ports Menu.



2. Select Standard Network.



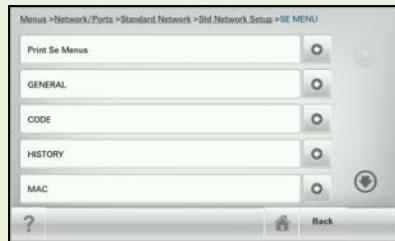
3. Select STD NET SETUP.



4. Once in the Standard Network Setup page, press 6, 7 and 9 at the same time.



5. Once you press the buttons, you should be in the Network SE Menu.



The Network SE menu contains advanced network menu tools.

Warning: Changing the settings within this menu may cause the printer not to function properly.

MS610de Control Panel



4.3 inch diagonal Color LCD Resistive panel

Touch sensitive graphical user interface

15 tactile buttons

1 indicator LED

Buttons and Functions

Part	Description	Function
	Display	View the printer status and messages. Set up and operate the printer.
	Home button	Go to the home screen.
	Keypad	Enter numbers, letters, or symbols.
	Sleep button	Enable Sleep Mode or Hibernate Mode . The following actions wake the printer from Sleep mode: <ul style="list-style-type: none">• Pressing any hard button• Opening a tray or the front door• Sending a print job from the computer• Performing a power-on reset using the main power switch• Attaching a device in the USB port
	Stop button	Stop all printer activities.
	Indicator Light	Determine the status of the printer.
	USB port	Connect a flash drive to the printer.

Administrative Menu: MS610de

For a complete listing of the printer menu tree, consult the User's Guide.

MS610de Administrative (Customer) Menu Tree

Paper Menu	Reports	Network/Ports
Default Source	Menu Settings Page	Active NIC
Paper Size/Type	Device Statistics	Standard Network ³
Configure MP	Network Setup Page ²	Reports
Substitute Size	Profiles List	Network Card
Paper Texture	Print Fonts	TCP/IP
Paper Weight	Print Directory	IPv6
Paper Loading	Print Demo	Wireless
Custom Types	Asset Report	AppleTalk
Custom Names ¹		Standard USB
Universal Setup		Parallel ⁴
		SMTP Setup

Security
Miscellaneous Security Settings ⁴
Confidential Print
Disk Wiping ⁴
Security Audit Log
Set Date and Time

Settings
General Settings
Flash Drive Menu ⁴
Print Settings

Help
Print All Guides
Print Quality
Media Guide
Print Defects Guide
Menu Map
Information Guide
Connection Guide
Moving Guide
Supplies Guide

¹ This menu appears only in touch screen printer models.

² Depending on the printer setup, this menu item appears as Network Setup Page or Network [x] Setup Page.

³ Depending on the printer setup, this menu item appears as Standard Network or Network [x].

⁴ This feature is available only in select printer models.

Service Menus: MS610de

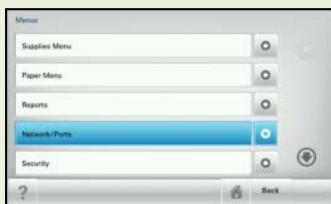
For a complete list of these menus, consult the Service Manual for the printer.

Diagnostics Mode	To enter the Diagnostic Menu , do the following: 1. Turn off the printer. 2. Press and hold 3 and 6 . 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	The Diagnostics Menu contains advanced settings and operations used for repair, adjustments or other diagnostic actions.
Configuration Menu	To enter Configuration Menu , do the following: 1. Turn off the printer. 2. Press and hold 2 and 6 . 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	The Configuration Menu contains a set of menus, settings and operations which are infrequently required by a user. Generally, the options made available in this menu group are used to configure a printer for operation.
Network SE Menu	To enter the Network SE Menu , do the following: 1. Enter Network/Ports>Standard Network>Std Network Setup menu. 2. Press and hold 6 , 7 and 9 . 3. Release the buttons when the Network SE Menu appears. 	You do not POR the machine to access this menu.
SE Menu	From a browser, add "/se" to the device IP address. (for example: http://158.183.3.2/se)	Capture diagnostic and debug data.
Invalid Engine Code	To enter the Invalid Engine Code state, do the following: 1. Turn off the printer. 2. Press and hold 3 , 4 and 6 . 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	This state allows you to POR the printer into a mode that disables the Engine Code and allows the programming of new code into the Engine card. Typically this function is used to reprogram defective Engine code but can be useful in other applications.

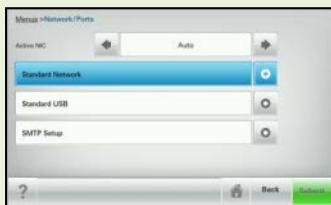
Safe Mode	<p>To Enable/Disable Safe Mode, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 6 and 7. 3. Turn on the printer. <p>Release the buttons when the splash screen appears.</p> <p style="text-align: center;">***** OR *****</p> <p>Go to Configuration Menu:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 2 and 6. 3. Turn on the printer. 4. Go to Safe Mode Menu 5. Select ON/OFF 6. POR the printer to take effect 	<p>NOTE: Only available for printers with a code level of EC1 or greater.</p> <p>Allows print operations to be used even if a non-critical subsystem failure occurs. When configured in Safe Mode, the device operates in a minimal/base function state for print operations, permitting a customer to continue printing until service can be arranged to repair the device. Safe Mode is designed to be a short-term solution.</p> <ul style="list-style-type: none"> • Safe Mode state will not disable on POR without holding down the special button sequence. • Safe Mode can co-exist with other POR button sequence modes, such as Config and Diagnostics.
Restore Point	<p>To go to the Restore Point, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 7 and 8. 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>NOTE: Only available for printers with a code level of EC1 or greater.</p> <p>NOTE: Not all printers have this functionality; it is limited to printers with 4.3" and above Touchscreen.</p> <p>Restore point is a new functionality similar to a PC's operating system restore. In the event that a new firmware update causes problems in the printer, the administrator or customer can roll the printer back to a previous state.</p> <p>Important Information:</p> <ul style="list-style-type: none"> • Subsequent POR's boot to this restore point. • If new code is flashed, that new code becomes the boot point. • Only 1 restore point is kept. • If no code updates have occurred since the machine was built, there is no restore point and the key sequence is ignored. • Only available on eTask machines.

Network SE Menu

1. In the Administration (Customer) Menu, select the Network/Ports Menu.



2. Select Standard Network.



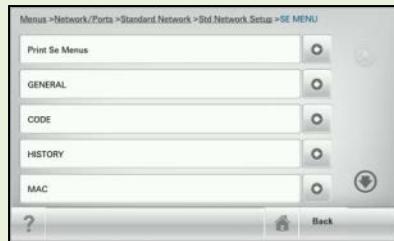
3. Select STD NET SETUP.



4. Once in the Standard Network Setup page, press 6, 7 and 9 at the same time.



5. Once you press the buttons, you should be in the Network SE Menu.



The Network SE menu contains advanced network menu tools.

Warning: Changing the settings within this menu may cause the printer not to function properly.

MX310dn Control Panel



2.4 inch color display
27 "hard" buttons

MX410de/MX510de/MX511de Control Panel



4.3 inch diagonal Color LCD Touch screen Graphical User Interface
20 "hard" buttons

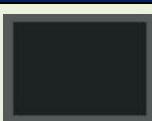
MX610de/MX611de/MX611dhe Control Panel



7.0 inch diagonal Color LCD Touch screen Graphical User Interface
19 "hard" buttons

The following page contains a detailed description of the Control Panel buttons and their functions.

Buttons and Functions: MX310/MX410/MX51x/MX61x

Part	Description	Function
	Display	View the printer status and messages. Set up and operate the printer.
	Keypad	Enter numbers, letters, or symbols.
	Indicator Light	Determine the status of the printer.
	Home button	Go to the home screen.
	Back button	Return to the previous screen.
	Sleep button	Enable Sleep Mode or Hibernate Mode . The following actions wake the printer from Sleep mode: <ul style="list-style-type: none">• Pressing any hard button• Opening a tray or the front door• Sending a print job from the computer• Performing a power-on reset using the main power switch• Attaching a device in the USB port
	Stop button	Stop all printer activities.
	Clear All / Reset button	Reset the default settings of a function, such as printing, copying, or e-mailing.
	USB port	Connect a flash drive to the printer. Notes: Only the front USB port supports flash drives. This feature is available only in select printer models.

MX310/MX410/MX51x Home Screen Menus



#	Description	Function
1	Copy	Opens the Copy menu and makes copies.
2	Fax	Opens the Fax menu and sends a fax.
3	E-mail	Opens the E-mail menu and sends an e-mail.
4	FTP	Opens the File Transfer Protocol (FTP) menu and scans documents directly to an FTP Server. Note: This function must be set up by your system administrator.
5	Menus	Opens the Administrative (Customer) menus. These menus are available only when the printer is in the "Ready" state.
6	Status Message Bar	Show the current printer status such as Ready or Busy. Show printer conditions such as Fuser Missing or Cartridge Low. Show intervention messages so the printer can continue processing.
7	Status/Supplies	Displays a warning or error message whenever the printer requires intervention to continue processing. Touch this to access the messages screen for more information on the message, and how to clear it.

MX61x Home Screen Menus



#	Description	Function
1	Change Language	Allows you to change the primary language and reports on the display, and will remain in effect until changed.
2	Copy	Opens the Copy menu and makes copies.
3	Fax	Opens the Fax menu and sends a fax.
4	E-mail	Opens the E-mail menu and sends an e-mail.
5	FTP	Opens the File Transfer Protocol (FTP) menu and scans documents directly to an FTP Server. Note: This function must be set up by your system administrator.
6	Arrows	Scroll up or down to display the next screen.
7	Forms and Favorites	Quickly find and print frequently used online forms.
8	Menus	Opens the Administrative (Customer) menus. These menus are available only when the printer is in the "Ready" state.
9	Bookmarks	Allows you to create, organize, and save a set of bookmarks (URLs) into a tree view of folders and file links.
10	USB	View, select, print, scan, or e-mail photos and documents from a flash drive. Note: This button appears only when you return to the home screen while a memory card or flash drive is connected to the printer.
11	Held Jobs	Displays all held jobs.
12	Status/Supplies	Displays a warning or error message whenever the printer requires intervention to continue processing. Touch this to access the messages screen for more information on the message, and how to clear it.
13	Tips	Opens context-sensitive Help information on the touch screen.
14	Search Held Jobs	Searches on any of the following items and returns search results: <ul style="list-style-type: none"> • User names for held or confidential print jobs • Job names for held jobs, excluding confidential print jobs • Profile names, bookmark container or job names, etc.

Administrative Menu: MX310/MX410/MX51x/MX61x

For a complete listing of the printer menu tree, consult the User's Guide.

MX310/MX410/MX510/MX610 Series Administrative (Customer) Menu Tree

Paper Menu	Reports	Network/Ports	Security
Default Source	Menu Settings Page	Active NIC	Edit Security Settings
Paper Size/Type	Device Statistics	Standard Network ²	Miscellaneous Security Settings
Configure MP	Stapler Test	Standard USB	Confidential Print Menu
Substitute Size	Network Setup Page ¹	Parallel [x]	Disk Wiping ⁴
Paper Texture	Network [x] Setup Page	Serial [x]	Security Audit Log
Paper Weight	Shortcut List	SMTP Setup	Set Date and Time
Paper Loading	Fax Job Log		
Custom Types	Fax Call Log		
Custom Names ¹	Copy Shortcuts		
Custom Scan Sizes	E-mail Shortcuts		
Universal Setup	Fax Shortcuts		
	FTP Shortcuts		
	Profiles List		
	Print Fonts		
	Print Directory ⁴		
	Print Demo		
	Asset Report		

Settings	Help	Manage Shortcuts	Option Card Menu ^{3,4}
General Settings	Print All Guides	Fax Shortcuts	A list of installed DLEs (Download Emulators) appears.
Copy Settings	Copy Guide	E-mail Shortcuts	
Fax Settings	E-mail Guide	FTP Shortcuts	
E-mail Settings	Fax Guide	Copy Shortcuts	
FTP Settings	FTP Guide	Profile Shortcuts	
Flash Drive Menu ⁴	Print Defects Guide		
	Information Guide		
	Supplies Guide		

¹ Depending on the printer setup, this menu appears as Network Setup Page or [x] Page.

² Depending on the printer setup, this menu appears as Standard Network or [x].

³ This menu is supported only in select printer models and appears only when one or more DLEs are installed.

⁴ This menu is supported only for MX410, MX510 and MX511.

Service Menus: MX310/MX410/MX51x/MX61x

For a complete list of these menus, consult the Service Manual for the printer.

Diagnostics Mode	<p>To enter the Diagnostic Menu, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 3 and 6. 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>The Diagnostics Menu contains advanced settings and operations used for repair, adjustments or other diagnostic actions.</p>
Configuration Menu	<p>To enter Configuration Menu, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 2 and 6. 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>The Configuration Menu contains a set of menus, settings and operations which are infrequently required by a user.</p> <p>Generally, the options made available in this menu group are used to configure a printer for operation.</p>
Network SE Menu	<p>To enter the Network SE Menu, do the following:</p> <ol style="list-style-type: none"> 1. Enter Network/Ports>Standard Network>Std Network Setup menu. 2. Press and hold 6, 7 and 9. 3. Release the buttons when the Network SE Menu appears. 	<p>You do not POR the machine to access this menu.</p>
SE Menu	<p>From a browser, add "/se" to the device IP address. (for example: http://158.183.3.2/se)</p>	<p>Configure or reset advanced Network settings.</p>
Invalid Engine Code	<p>To enter the Invalid Engine Code state, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 3, 4 and 6. 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>This state allows you to POR the printer into a mode that disables the Engine Code and allows the programming of new code into the Engine card.</p> <p>Typically this function is used to reprogram defective Engine code but can be useful in other applications.</p>
Recovery Mode	<p>To enter Recovery Mode, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 2, 7 and 8. 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>NOTE: Recovery only available on non-eTask printers.</p> <p>This mode will allow the printer to boot from a secondary set of instructions to allow a code flash to the printer. No other functions are available. The screen will have a red background and say "Recovery".</p> <p>While in this mode, you can ONLY flash code via USB directly connected to a PC.</p>

Safe Mode	<p>To Enable/Disable Safe Mode, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 6 and 7. 3. Turn on the printer. <p>Release the buttons when the splash screen appears.</p> <p style="text-align: center;">***** OR *****</p> <p>Go to Configuration Menu:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 2 and 6. 3. Turn on the printer. 4. Go to Safe Mode Menu 5. Select ON/OFF 6. POR the printer to take effect 	<p>NOTE: Only available for printers with a code level of EC1 or greater.</p> <p>Allows print operations to be used even if a non-critical subsystem failure occurs. When configured in Safe Mode, the device operates in a minimal/base function state for print operations, permitting a customer to continue printing until service can be arranged to repair the device. Safe Mode is designed to be a short-term solution.</p> <ul style="list-style-type: none"> • Safe Mode state will not disable on POR without holding down the special button sequence. • Safe Mode can co-exist with other POR button sequence modes, such as Config and Diagnostics.
Restore Point	<p>To go to the Restore Point, do the following:</p> <ol style="list-style-type: none"> 1. Turn off the printer. 2. Press and hold 7 and 8. 3. Turn on the printer. 4. Release the buttons when the splash screen appears. 	<p>NOTE: Only available for printers with a code level of EC1 or greater.</p> <p>NOTE: Not all printers have this functionality; it is limited to printers with 4.3" and above Touchscreen.</p> <p>Restore point is a new functionality similar to a PC's operating system restore. In the event that a new firmware update causes problems in the printer, the administrator or customer can roll the printer back to a previous state.</p> <p>Important Information:</p> <ul style="list-style-type: none"> • Subsequent POR's boot to this restore point. • If new code is flashed, that new code becomes the boot point. • Only 1 restore point is kept. • If no code updates have occurred since the machine was built, there is no restore point and the key sequence is ignored. • Only available on eTask machines.

Network SE Menu

1. In the Administration (Customer) Menu, select the Network/Ports Menu.



2. Select Standard Network.



3. Select STD NET SETUP.



4. Once in the Standard Network Setup page, press 6, 7 and 9 at the same time.



5. Once you press the buttons, you should be in the Network SE Menu.



The Network SE menu contains advanced network menu tools.

Warning: Changing the settings within this menu may cause the printer not to function properly.

Supplies

Supply Changes and Key Updates

The table below summarizes the biggest changes to the supply hardware and messaging for the MS and MX series.

MS and MX Models	
New Supply Life Messaging	 Cartridge very low, 200 estimated pages remain <div style="background-color: #0072BD; color: white; padding: 5px; text-align: center;">OK</div>
Non-continuable Stop when Supplies are Exhausted	 Replace cartridge, 0 estimated pages remain <div style="background-color: #0072BD; color: white; padding: 5px; text-align: center;">OK</div>
	<ul style="list-style-type: none"> • A yellow triangle “alert” icon appears when any supply is in a warning state. • Red bouncing animation will show up for Intervention Requests. • Warning messages appear at bottom of home screen. • Status messages will be in black text for warnings (no red triangle), red text for Intervention Requests. • The screens to the right will only show after pushing the intervention button.
Imaging Unit	
Toner Cartridge	

Supply Life Messaging Information

Toner Cartridge Life Messaging

The following table provides the messaging that will appear on the Control Panel as supply life becomes low. Below the table, explanations are provided for the headings and options listed in each column.

Life Cycle State	Default Setting	Control Panel Message	Toner Level	Default Trip Point ¹	Behavior Options ² (Default in Blue)
Nearly Low	Disabled	Cartridge nearly low [88.xy]		1.5K = 40% 2.5K = 30% 5K = 30% 6K = 20% 7.5K = 20% 8.5K = 20% 10K = 20% 20K = 20%	Off Warning Email Alert Continuable Stop Non-Continuable Stop
Low	Enabled	Cartridge Low [88.xy]		1.5K = 30% 2.5K = 20% 5K = 20% 6K = 10% 7.5K = 10% 8.5K = 10% 10K = 10% 20K = 10%	Off Warning Email Alert Continuable Stop Non-Continuable Stop
Near End of Life	Enabled	Cartridge very low, [X] ³ estimated pgs remain [88.xy] Page by page countdown begins.		1.5K = 10% 2.5K = 7% 5K = 4% 6K = 3% 7.5K = 3% 8.5K = 2% 10K = 2% 20K = 1%	Off Warning Email Alert Continuable Stop Non-Continuable Stop
End of Life Device Stops	Enabled	Replace cartridge, 0 ³ estimated pgs remain [88.xy]		0%	Non-Continuable Stop

¹ This column indicates the default Toner Cartridge life remaining. Once the Toner Cartridge reaches this percentage, it will trigger the given warning. The user can change the level that will trigger the warning. The procedures to do this are documented in this guide in the section called "How to Change Supply Life Messaging Settings."

² This column lists the default behavior options at each warning notification. The customer can customize this feature. The default behavior is documented in blue if no change is made.

³ The estimated number of remaining pages is based on recent printing history of the printer. Its accuracy may vary significantly and is dependent on many factors, such as actual document content, print quality settings, and other printer settings. The accuracy of the estimated number of remaining pages may decrease when actual printing consumption is different from the historical printing consumption. Consider the variable level of accuracy before purchasing or replacing supplies based upon the estimate. Until an adequate print history is obtained on the printer, initial estimates assume future supplies consumption based on the International Organization for Standardization* test methods and page content.

*Average continuous black declared cartridge yield in accordance with ISO/IEC 19752

Imaging Unit Life Messaging

The following table provides the messaging that will appear on the Control Panel as supply life becomes low. Below the table, explanations are provided for the headings and options listed in each column.

Life Cycle State	Default Setting	Control Panel Message	Default Trip Point ¹	Behavior Options ² (Default in Blue)
Nearly Low	Disabled	Imaging unit nearly low [84.xy]	100K = 10%	Off Warning E-mail alert Continuable stop Non-continuable stop
Low	Enabled	Imaging unit low [84.xy]	100K = 5%	Off Warning E-mail alert Continuable stop Non-continuable stop
Near End of Life	Enabled	Imaging unit very low [X] ³ estimated pgs remain [84.xy] Page by page countdown begins.	100K = 1%	Off Warning E-mail alert Continuable stop Non-continuable stop
End of Life Device Stops	Enabled	Replace imaging unit, 0 ³ estimated pgs remain [84.xy]	0%	Non-continuable stop

¹ This column indicates the default Imaging Unit life remaining. Once the Imaging Unit reaches this percentage, it will trigger the given warning. The user can change the level that will trigger the warning. The procedures to do this are documented in this guide in the section called "How to Change Supply Life Messaging Settings."

² This column lists the default behavior options at each warning notification. The customer can customize this feature. The default behavior is documented in blue if no change is made.

³ The estimated number of remaining pages is based on recent printing history of the printer. Its accuracy may vary significantly and is dependent on many factors, such as actual document content, print quality settings, and other printer settings. The accuracy of the estimated number of remaining pages may decrease when actual printing consumption is different from the historical printing consumption. Consider the variable level of accuracy before purchasing or replacing supplies based upon the estimate. Until an adequate print history is obtained on the printer, initial estimates assume future supplies consumption based on the International Organization for Standardization* test methods and page content.

*Average continuous black declared cartridge yield in accordance with ISO/IEC 19752.

Maintenance Kit Life Messaging

The following table provides the messaging that will appear on the Control Panel as supply life becomes low. Below the table, explanations are provided for the headings and options listed in each column.

Life Cycle State	Default Setting	Control Panel Message	Default Trip Point ¹	Behavior Options ² (Default in Blue)
Nearly Low	Disabled	Maintenance kit nearly low [80.0x]	200K = 10%	Off Warning E-mail alert Continuable stop Non-continuable stop
Low	Disabled	Maintenance kit low [80.1x]	200K = 5%	Off Warning E-mail alert Continuable stop Non-continuable stop
Near End of Life	Enabled	Maintenance kit very low [80.2x] <i>The estimated number of pages remaining will not be displayed.</i>	200K = 1%	Off Warning E-mail alert Continuable stop Non-continuable stop
End of Life	Enabled	Replace maintenance kit ,0 ³ estimated pgs remain [80.3x]	0%	Warning E-mail alert Continuable stop Non-continuable stop
Absolute End of Life Device Stops	Enabled	Replace maintenance kit ,0 ³ estimated pgs remain [80.3x]	0%	Non-continuable Stop

¹ This column indicates the default Maintenance Kit life remaining trip point. Once the Maintenance Kit reaches this percentage, it will trigger the given warning. The user can change the level that will trigger the warning. The procedures to do this are documented in this guide in the section called "How to Change Supply Life Messaging Settings."

² This column lists the default behavior options at each warning notification. The customer can customize this feature. The default behavior is documented in blue if no change is made.

³ The estimated number of remaining pages is based on recent printing history of the printer. Its accuracy may vary significantly and is dependent on many factors, such as actual document content, print quality settings, and other printer settings. The accuracy of the estimated number of remaining pages may decrease when actual printing consumption is different from the historical printing consumption. Consider the variable level of accuracy before purchasing or replacing supplies based upon the estimate. Until an adequate print history is obtained on the printer, initial estimates assume future supplies consumption based on the International Organization for Standardization* test methods and page content.

*Average continuous black or composite CMY declared cartridge yield in accordance with ISO/IEC 19798.

How to Change Supply Life Messaging Settings

1. Access the printer's Embedded Web Server (EWS).
2. Click **Settings > Print Settings > Supply Notifications**.
3. Change the settings as desired. Refer to "Adjustable Supplies Alert Options" for the acceptable values.

The screenshot shows the 'Supply Notifications' section of the Lexmark EWS. On the left is a sidebar with links: Device Status, Copy Printer Settings (selected), Settings, Reports, Links & Index, Remote Operator Panel, and Order Supplies. The main area has a title 'Settings' and a sub-section 'Supply Notifications'. Below that is a link 'Custom Supply Messages' and 'Setting Explanations'. A note says 'In the following table you can configure each of the supplies in the machine.' A red box highlights the configuration table for two supplies: 'Black Cartridge' and 'Imaging Unit'. The table has columns for 'Nearly Low', 'Low', 'Near End of Life', and 'End of Life'. For 'Black Cartridge', 'Nearly Low' behavior is 'Off' at 20%, 'Low' behavior is 'Warning' at 10%, 'Near End of Life' behavior is 'Warning' at 1%, and 'End of Life' behavior is 'Non Continuable Stop'. For 'Imaging Unit', 'Nearly Low' behavior is 'Off' at 10%, 'Low' behavior is 'Warning' at 5%, 'Near End of Life' behavior is 'Warning' at 1%, and 'End of Life' behavior is 'Non Continuable Stop'.

	Nearly Low	Low	Near End of Life	End of Life
Black Cartridge	Behavior: Off Percent: 20 %	Behavior: Warning Percent: 10 %	Behavior: Warning Percent: 1 %	Behavior: Non Continuable Stop
Imaging Unit	Behavior: Off Percent: 10 %	Behavior: Warning Percent: 5 %	Behavior: Warning Percent: 1 %	Behavior: Non Continuable Stop

Adjustable Supplies Alert Options

The table below outlines the acceptable ranges that can be entered for the various supplies.

Supply	Nearly Low			Low			Near End of Life Default - not adjustable
	Max	Default	Min	Max	Default	Min	
Cartridge Yield							
500	90%	40%	30%	50%	30%	21%	20%
1500	90%	40%	30%	50%	30%	11%	10%
2500	90%	30%	20%	50%	20%	8%	7%
5000	90%	30%	20%	50%	20%	5%	4%
6000	90%	20%	10%	50%	10%	4%	3%
7500	90%	20%	10%	50%	10%	4%	3%
8500	90%	20%	10%	50%	10%	3%	2%
10000	90%	20%	10%	50%	10%	3%	2%
15000	90%	20%	10%	50%	10%	2%	1%
20000	90%	20%	10%	50%	10%	2%	1%
Imaging Unit	Max	Default	Min	Max	Default	Min	Default - not adjustable
	90%	20%	10%	50%	10%	2%	1%

Notes:

- If a user selects a value outside of these acceptable ranges, it will revert back to the default setting.
- If a user changed the setting and then installs a new supply, the same user setting will "stick" as long as the setting is still valid for the new supply.
- If a user has selected a value that is valid for the supply installed, but then changes to a different supply that the selection is no longer valid, it will revert back to the default setting. (i.e. user selected Low = 3% for 45K cartridge, and then later installs a 6K cartridge, the Low setting will revert back to 10%)

Detection of Non-Genuine Supplies

When the printer senses that the Imaging Unit, Toner Cartridge or Fuser is not a genuine Lexmark part, the printer will post this error message:

Non-Lexmark [supply], see User's Guide [33.xy]

In this case, the control panel will instruct the User to refer to the Troubleshooting Section of the User's Guide for instructions on how to proceed.

The User's Guide documents warnings about using non-genuine supplies. If the customer wishes to accept the risks of non-genuine supply they may document this acceptance by pressing the "OK" and "X" keys simultaneously for 15 seconds. In response, the printer will continue and mark a flag in NVRAM that the customer acceptance has occurred. In addition the bottom of the Device Statistics page will denote that the customer has accepted the non-genuine supply.

The following is the message that will appear on the Device Statistics page:

PostScript Menu		Feed Thruect	= 60
Print PS Error	= Off	Stored Job Limit	= 5
Lock PS Startup Mode	= Off		
PCL Emul Menu			
Font Source	= Resident	Device Information	
Font Name	= R0 Courier	Page Count	= 849061
Symbol Set	= BU Roman-8	Installed Memory	= 256 MB
PCL Emulation Settings		Processor Speed	= 800 MHz (2)
Pitch	= 10.00	Processor ID	= 00000000000100db
Orientation	= Portrait	Serial Number	= 406312790005P
Lines per Page	= 60	T1	= 4060310
A4 Width	= 198 mm	Engine Mode	= 0
Auto CR after LF	= Off	Machine Type	= 4063-630
Auto LF after CR	= Off	Asset Tag	= 2 core(s) active
Tray Remap		Disk Last Wiped	=
Assign MP Feeder	= Off	Settings Last Wiped	=
Assign Tray 1	= Off	CalStat	= f1000000
Assign Manual Paper	= Off	Engine ID	= 70-NGLD
Assign Manual Envelope	= Off	Fuser Type	= 00
View Factory Defaults		Debug Level	= Max, Debug
MPF Default = 8		Loader	= LW1.DN2.P115-0
T1 Default = 1		Kernel	= FWN.YS.F115-0
T2 Default = 4		Base	= LW1.DN2.P115-0
T3 Default = 5		Network	= NW1.YS.N115-0
T4 Default = 20		Network Drvr	= LW1.DN2.P115-0
T5 Default = 21		Engine	= FDN.DN.E111-0
Env Default = 6		Panel	= v0.0e2.3h2c129
MPaper Default = 2		Green Micro	= Boot_v00.00-App_v01.11
MEnv Default = 3		Font	= 8.11H01-US.021
Restore Defaults		Crypto Module	= 2.00
HTML Menu			
Font Name	= Times		
Font Size	= 12pt		
Scale	= 100%		
Orientation	= Portrait		
Margin Size	= 19mm		
Backgrounds	= Print		
The printer has detected a non-Lexmark supply or part installed in the printer. Your Lexmark printer is designed to function best with genuine Lexmark supplies and parts. Use of third-party supplies or parts may affect the performance, reliability, or life of the printer and its imaging components.			

If the customer accepts the risks of using non-genuine supplies or parts, errors posted by exposed supplies/devices will include an "N" at the end of the error number string.

Example: "Cyan imaging unit near end of life 84.21N" or "Paper Jam 200.13N"

The customer may decide **not** to accept the risks associated with using non-genuine Lexmark supplies or parts. This is done by **not** pressing the special key sequence as described above in the User's Guide; instead, the customer must remove the non-genuine Lexmark supply or part and replace it with a genuine Lexmark supply or part.

Toner Cartridges

MS31x, MS41x, MS510 and MS610 Series

Toner Cartridges	Approximate Yield ²	MS310	MS312	MS315	MS410	MS415	MS510	MS610
Starter Toner Cartridge (SWE)¹	1,500 pages	Y	Y	N	N	N	N	N
Starter Toner Cartridge (SWE)¹	2,500 pages	N	N	N	Y	N	N	N
Starter Toner Cartridge (SWE)¹	3,000 pages	N	N	Y	N	Y	N	N
Starter Toner Cartridge (SWE)¹	6,000 pages	N	N	N	N	N	Y	Y
Toner Cartridge	1,500 pages	Y	Y	Y	Y	Y	Y	Y
High Yield Toner Cartridge	5,000 pages	Y	Y	Y	Y	Y	Y	Y
Extra High Yield Toner Cartridge	10,000 pages	N	N	N	Y	Y	Y	Y
Ultra High Yield Toner Cartridge	20,000 pages	N	N	N	N	N	Y	Y

¹ Ship With Equipment² Average continuous black cartridge yield is standard pages as listed. Declared yield value in accordance with ISO/IEC 19752. Actual yield will vary considerably based upon many factors. See www.Lexmark.com/yields for more info.

MX310, MX410, MX51x and MX61x

Toner Cartridges	Approximate Yield ²	MX310	MX410	MX510	MX610
Starter Toner Cartridge (SWE)¹	2,500 pages	Y	N	N	N
Starter Toner Cartridge (SWE)¹	5,000 pages	N	Y	Y	N
Starter Toner Cartridge (SWE)¹	7,500 pages	N	N	N	Y
Toner Cartridge	2,500 pages	Y	Y	Y	Y
High Yield Toner Cartridge	10,000 pages	Y	Y	Y	Y
Extra High Yield Toner Cartridge	20,000 pages	N	N	Y	Y

¹ Ship With Equipment² Average continuous black cartridge yield is standard pages as listed. Declared yield value in accordance with ISO/IEC 19752. Actual yield will vary considerably based upon many factors. See www.Lexmark.com/yields for more info.

Imaging Units

	Approximate Yield ¹	Ship with Equipment	Aftermarket Version Available
Imaging Unit (MS & MS Models)	60,000 pages	Y	Y

¹ Imaging Unit Estimated Yield: Up to 60,000 pages, based on 3 average Letter/A4-size pages per print job at approximately 5% coverage. Actual Yield will vary considerably based on other factors such as device speed, paper size and feed orientation, toner coverage, tray source and print job complexity.

Maintenance Items

Only available for the models indicated below:

MS510 and MS610

Item	Approximate Yield ¹	Customer Installable
Fuser	200, 000	No
ACM Pick Tires	200, 000	No
Transfer Roll	200, 000	No
MPF pick roller and separator pad	200, 000	No
Redrive Assembly	200, 000	No
Separator Roll Assembly	200, 000	No

¹The fuser may reach a life of up to 200,000 pages, based on an average of 3 pages per job and approximately 5% coverage. Because these modules are affected by environment, duty cycle and toner coverage, actual page count may vary.

MX310, MX410, MX51x and MX61x

Item	Approximate Yield ¹	Customer Installable
Fuser	200, 000	No
ACM Pick Tires	200, 000	No
Transfer Roll	200, 000	No
MPF pick roller and separator pad	200, 000	No
Redrive Assembly	200, 000	No
Separator Roll Assembly	200, 000	No

¹The fuser may reach a life of up to 200,000 pages, based on an average of 3 pages per job and approximately 5% coverage. Because these modules are affected by environment, duty cycle and toner coverage, actual page count may vary.

Notes:

- Maintenance kit alerts are based on printer NVRAM page count or fuser revs counter, whichever hits the limit first.
- Page count limit is 200K pages, fuser rev limit is 2.2 million revs
- To reset maintenance kit counters, boot printer into Configuration Mode (press and hold 2 and 6 during printer power on) and select “Reset Maintenance Counter”.
- There are no hard stops for maintenance kit alerts for this printer series.

Hardware Changes

The new MS and MX series printers have significant hardware and functionality changes from previous models. Below is an overview of these changes.

Print Head EC – May 2015

This document is applicable to the following Lexmark printer models:

- Single function: MS415, MS510, MS610, M1140, M1145, & M3150
- Multifunction: MX310, MX410, MX510, MX511, MX610, MX611, XM1140, XM1145, & XM3150

Overview

The engineering change (EC) discussed in this document describes the laser **printhead technology** update for small and medium workgroup monochrome printers. In this update, the **Polygon**-type printhead will be replacing the conventional **Galvo** printhead.

NOTE: This EC is a hardware technology change not a model refresh, thus:

- Same printer orderable part number, TLI, and Machine Type/Model Number
- New FRU parts available for support of new hardware

Handling Service Calls

Technical Support and Service Partners will support business as usual. You should easily identify which printhead is needed by checking the **serial number (SN)** code and the **black dot** on the SN sticker label.

- **Serial Number Identification** – Check the **6th digit** starting from the left-hand side:
 - **B-N** and **0-9** indicates **Galvo** printhead
 - **P-Y** indicates **Polygon** LSU
- **SN sticker label Identification**
 - **Black Dot** on printer SN label indicates **Polygon** LSU (see red arrow in the right-hand image below)
 - **No Dot** indicates **Galvo** printhead



- **Controller card color**
 - **Green** controller card – **Galvo** printhead
 - **Blue** controller card – **Polygon** printhead (comes with EC5 or greater)

- **Compatibility Chart and Printer Action**

FW Version Scenario: Device is loaded with P522 and User tries to update FW to following version	HW with Galvo Printhead Printer action	HW with Polygon Printhead Printer action
EC0 to EC4	OK Boot to Ready	" Invalid Version " message on control panel
P521 and below	OK Boot to Ready	" Invalid Version " message on control panel
P522 and above	OK Boot to Ready	OK Boot to Ready

NOTES:

- The Green and Blue Controller card **MUST** be matched to the correct Polygon or Galvo technology printhead.
- The Blue Controller card for the Polygon Printhead will **NOT** accept firmware lower than **EC5**.
- The Green Controller will accept all EC levels of firmware.
- The new Polygon-type printhead requires Firmware **EC5** or the **latest**. The printers with this new hardware will **NOT** load lower versions of firmware and will post "**Invalid version**."
- The **EC5 and greater firmware is backward compatible**.
- The new **Polygon Hardware is NOT backward compatible**.
- There are separate part numbers for each printhead type and both will be orderable for this program.

Firmware requirements

The new Polygon-type printhead requires Firmware (FW) **EC5** or the **latest**. The printers with this new hardware will not load lower versions of FW and will post "**invalid version**."

EC5 FW will be available for download from the website in **May 2015**. If EC5 FW is needed prior to this for certification work, contact the Firmware team via Lexmark Technical Support.

Cartridge Shutter/Plunger

The Toner Cartridge has a built-in shutter that closes when the Access Cover is opened.

The Cartridge shutter is opened by the Access Cover Plunger when the Access Cover is closed.

The printer is shipped from the factory with the Access Cover Plunger in the downward position.

Development recommends removing the cartridge and imaging unit for normal ship and storage needs.

For cases when supplies need to remain in machine, leave the plunger **engaged**. Testing has shown that shipping or moving these models with all or some of the supplies does not cause any significant leaks. The port and seal designs are very robust.

If the plunger is put into the ‘ship’ position without proper packaging, there is HIGH RISK that a user may simply turn on the printer and start printing – resulting in a 31.46 or 31.66 replenishing error or potential damage to the cartridge.

The most robust process is to put the plunger into the ‘ship’ state, but you **MUST** repackage the imaging unit (and cover the input sensor) to ensure that the front door is opened the next time the printer is turned on.



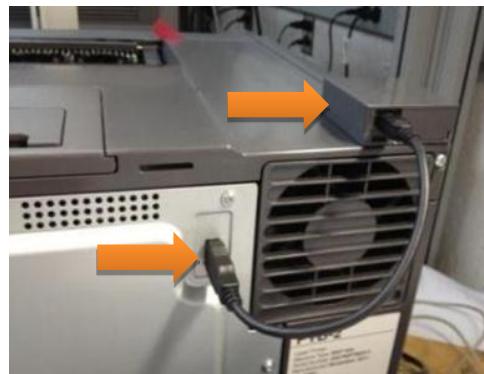
Customer Installable Wireless

A customer installable wireless option is now available for network-ready models.



Top View

Back View



Eliminated Sensors

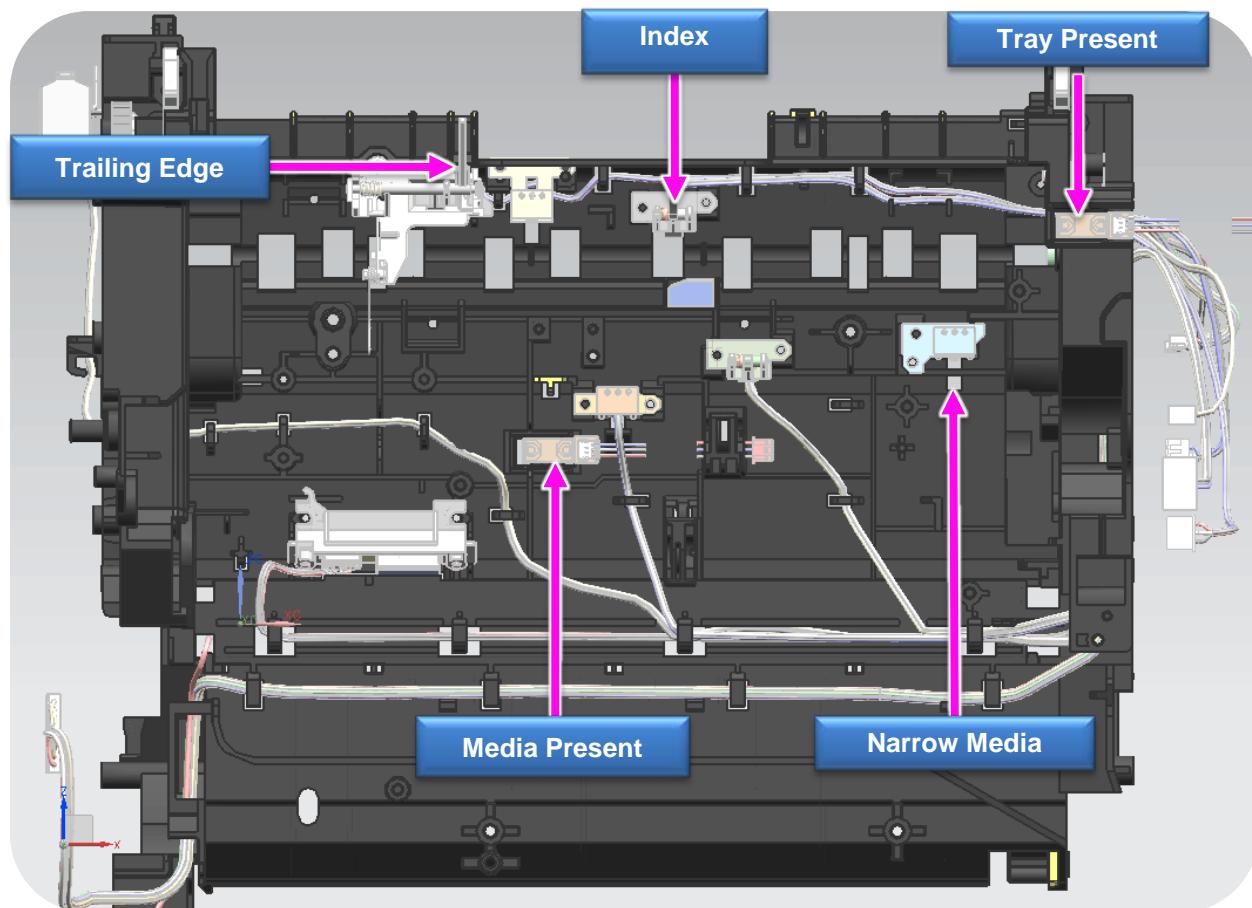
- Manual Feed
- Toner Level (reflective sensor)

New ESD Ground Points

- MPF Shaft
- Tray Lift Plate
- Upper Frame Top
- Guide-Front Cover Support

New Sensors

- Trailing Edge
 - Note:** For MS310 and MS410 models, it's located on the ACM assembly.
- Index (Lift plate models only)
- Tray 1 Media Present (Lift plate models only)
- Tray 1 Present (MS510/MS610 / MFP models only)
- Narrow Media MFP (MFP only)
- MPF Media Present
- IU Capacitive Toner Level Sensor (CTLS)



Firmware and Functionality Changes

Error Code Formatting

To provide consistency across different product lines, the error code formatting was improved so technicians can readily identify a category of problem based on the numeric code.

Error Code Range	Description
000 - 099	User-Related Errors
100 - 199	Engine Hardware Failure – Base Printer
200 - 299	Paper Jams – Base Printer / Input Options
300 - 399	Hardware Failure - Input / Output Options
400 - 499	Paper Jams - Output Options
840 - 849	ADF & FB Scanner Failure
900 - 999	Firmware and/or System Electronics Failure

Decoding Paper Jam Sub-error Codes <.xx>

Sub-error Codes <.xx>	Description
.01	Warm up jam (paper detected at POR)
.02	Sensor tripped too early
.03	Sensor never tripped
.04	Sensor cleared too early
.05	Sensor covered too long
.06	Paper did not reach first sensor after tray
.07	Sensor covered too long

Auto Reboot – Error Recovery

The goal of allowing the printer to auto-reboot when a catastrophic error occurs is to decrease customer interventions and increase printer up-time. The types of errors that could auto reboot include:

- **91y.xx Engine Firmware Errors**
- **976.xx Network Firmware Errors**
- **900.xx RIP Firmware Errors**

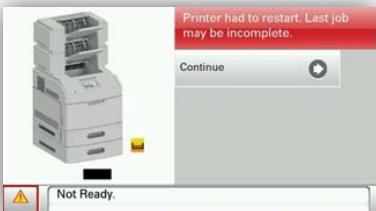
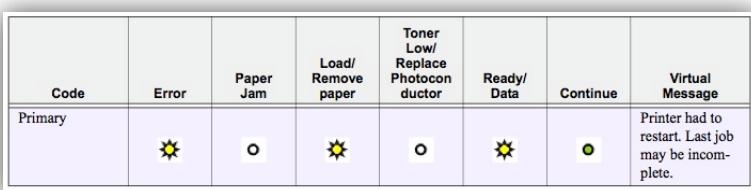
Note: Be aware that **not all of the Engine Firmware Errors** will allow an auto-reboot. The engine will inform the Controller Board if an Auto Reboot is allowed for the particular error.

Auto Reboot (Error Recovery) configuration and settings are shown in the following table:

Function	Configurable In:	Settings
Auto Reboot Mode	Customer Menus (UI)	Sets the printer to restart when an error is encountered. <ul style="list-style-type: none"> • Reboot when idle – for firmware errors if not printing, faxing, or scanning. Hardware related errors will still halt and display service error screen. • Reboot always (default) –auto-reboot for firmware errors even if printing, faxing, or scanning. • Reboot never – always halt and display the service error screen for firmware errors.
	Embedded Web Server	
Max Auto Reboots	Customer menus (UI)	Sets the number of automatic restarts the printer can perform per incidence 1-20. <ul style="list-style-type: none"> • 2 is the factory default setting. • When the number of max automatic restarts is reached, the printer displays the applicable error instead of restarting. Note: A clean power cycle or hibernation will reset the reboot count.
	Embedded Web Server	
Auto Reboot Counter	Embedded Web Server	The number of reboots encountered over the lifetime of the printer. This setting is to be used as diagnostic data. This setting can be reset to zero by MPS or by the Embedded Web Page.

- If a printer crashes but does not auto reboot, the traditional error screen displays on the control panel listing the error information.
- When a re-bootable crash occurs, the printer shows the traditional error screen with an additional message that informs the user the printer will reboot. The Error screen displays while the printer gathers debug information and writes it to flash (about 10 seconds). Once the debug collection has occurs, the printer will reboot.
- After rebooting, a message will be present informing the user the printer rebooted. The user must clear this error in order to continue using the printer. While this message is present, the printer is off-line and will not accept print jobs. See the images on the following page.

Sample Generic Control Panel Messages after Auto Reboot

2.4" Panel																	
4.3" Panel																	
10" Panel																	
LED Panel	 <table border="1"><thead><tr><th>Code</th><th>Error</th><th>Paper Jam</th><th>Load/ Remove paper</th><th>Toner Low/ Replace Photocon- ductor</th><th>Ready/ Data</th><th>Continue</th><th>Virtual Message</th></tr></thead><tbody><tr><td>Primary</td><td>★</td><td>○</td><td>★</td><td>○</td><td>★</td><td>○</td><td>Printer had to restart. Last job may be incomplete.</td></tr></tbody></table>	Code	Error	Paper Jam	Load/ Remove paper	Toner Low/ Replace Photocon- ductor	Ready/ Data	Continue	Virtual Message	Primary	★	○	★	○	★	○	Printer had to restart. Last job may be incomplete.
Code	Error	Paper Jam	Load/ Remove paper	Toner Low/ Replace Photocon- ductor	Ready/ Data	Continue	Virtual Message										
Primary	★	○	★	○	★	○	Printer had to restart. Last job may be incomplete.										

Safe Mode

Safe Mode is a new and configurable state in the device that allows print operations to be used even if a non-critical subsystem failure occurs. When configured in Safe Mode, the device operates in a minimal/base function state for print operations, permitting a customer to continue printing until service can be arranged to repair the device.

⚠ Warning! Safe Mode is intended as a short-term workaround and should **only be used when a critical print job must be completed before service can be arranged to repair the printer**. In most customer situations, it would **NOT** be appropriate to enable this mode. See the table below called *When Should Safe Mode be Enabled?* for examples.

⚠ Warning! The printer must be returned to standard operating mode before diagnostics can be run or full-function printing can continue. **This is IMPORTANT!** If a customer reports problems with no duplex capability and/or the inability to select optional input trays, etc., check to see if Safe Mode is enabled – a warning message will display on the Control Panel.

When Safe Mode is enabled, print jobs are processed based on the product-specific behavior of the print engine as defined for that mode of operation. Certain service failures and other errors are suppressed when the device is in this mode so the device is left in a temporary usable state.

When Safe Mode is disabled, if any service failure or other error occurs, the device will follow existing messaging behavior and the print operation will be terminated. The device may also shut down due to certain failures based on existing definitions.

When Should Safe Mode be Enabled?

Problem Example	Hypothetical Customer Situation	Enable Safe Mode? – Why/Why Not?
23y.xx Jams on Power-up – Duplex sensor broken	Customer has a deadline to complete an important print job before the end of the day – Service cannot be dispatched until tomorrow.	YES. The customer has a critical need to continue printing. Safe Mode will disable the duplex and allow the customer to continue to print at reduced functionality.
200.xx Jams on Power-up – Tray 1 Input sensor broken	Customer needs to complete a print job to send to a publisher by the end of the day. They only have 5 more pages left to print from the job. Service will not be out until tomorrow.	NO. The customer has a critical need to continue printing; however, Safe Mode <i>will not disable Tray 1</i> . For this printer, Safe Mode ignores all Input Options: Tray 2, Tray 3, etc. but Tray 1 functionality remains enabled.
242.xx Jams on Power-up – Tray 2 Input sensor broken	The customer is printing PowerPoint handouts for a meeting next week. They only had a few pages left to print.	NO. The customer does not have a critical need to continue printing.

Configuration and Management

Category	POR Sequence	Description
2.4" Control Panel and Touchscreen	7 + 6 (letters S+M = Safe Mode)	<ul style="list-style-type: none"> Safe Mode state will not disable on POR without holding down the special button sequence. Safe Mode can co-exist with other POR button sequence modes, such as Config and Diagnostics. Safe Mode can also be managed through the Config menu via the Safe Mode menu. If the Safe Mode setting is changed on this menu, the device must be POR'ed for the new setting to take effect.
2-line Control Panel	STOP + BACK	<ul style="list-style-type: none"> An NPA command can be issued to enable Safe Mode. If the Safe Mode setting is changed via NPA command, the device must be POR'ed for the new setting to take effect.
LED models (and all Control Panels)	NPA command	<ul style="list-style-type: none"> An NPA command can be issued to enable Safe Mode. If the Safe Mode setting is changed via NPA command, the device must be POR'ed for the new setting to take effect.

Safe Mode Messaging

Category	Messaging	Description																				
2.4" Control Panel and Touchscreen	"The device is operating in Safe Mode. Some print options may be disabled or provide unexpected results."	<ul style="list-style-type: none"> An intervention message will post at each POR once the device is in Safe Mode. Priority 1 warning message will be displayed, toggling in sequence with any other priority 1 warning messages, if any are present. If the device is POR'ed into Diagnostics, Configuration or SE menu, it will operate as if Safe Mode is disabled. A POR into any of these menus does not affect the Safe Mode setting. 																				
2-Line APA Control Panel	"Safe Mode"...	<ul style="list-style-type: none"> An intervention message will post at each POR once the device is in Safe Mode. A warning with custom message will appear and toggle with any other warning messages. 																				
LED Control Panel	<table border="1"> <thead> <tr> <th>Error</th> <th>Paper Jam</th> <th>Load/ Remove paper</th> <th>Toner Low/ Replace Photocon ductor</th> <th>Ready/ Data</th> <th>Continue</th> <th>Virtual Message</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Safe Mode</td> </tr> <tr> <td>off</td> <td>blinking</td> <td>blinking</td> <td>blinking</td> <td>off</td> <td>Solid on</td> <td></td> </tr> </tbody> </table> <p>This is the intervention light sequence at coming out of POR once the device is in Safe Mode.</p>	Error	Paper Jam	Load/ Remove paper	Toner Low/ Replace Photocon ductor	Ready/ Data	Continue	Virtual Message							Safe Mode	off	blinking	blinking	blinking	off	Solid on	
Error	Paper Jam	Load/ Remove paper	Toner Low/ Replace Photocon ductor	Ready/ Data	Continue	Virtual Message																
						Safe Mode																
off	blinking	blinking	blinking	off	Solid on																	

Error	Paper Jam	Load/ Remove paper	Toner Low/ Replace Photoconductor	Ready/ Data	Continue	Virtual Message
⊕	⊕	⊕	⊕	●	○	Ready Safe Mode
blinking slow	blinking slow	blinking slow	blinking slow	blinking slow	Solid on	
This is the light sequence at Ready/Idle indicating the printer is in Safe Mode.						

Safe Mode Print Behavior

The behavior of a device in Safe Mode is product-specific. The table below outlines the behavior for this printer series and may not apply to other models of the same code.

Safe Mode Engine Features	Engine Behavior	Control Panel Behavior
Simplex only	Will report no duplexer installed	Duplex print option will not be selectable
Ignore duplex sensor	Will report no duplexer installed	Duplex print option will not be selectable
Ignore bin full sensor	Bin full messages will not be reported	Bin full IRs will not occur
Print at narrow media operating point	Print at slow operating point	
Ignore narrow media sensor	Force narrow media	
Ignore all input options	Will report Tray 1 only as installed	Only Tray 1 and MPF will be selectable
Ignore all output options	Will not report any installed finishing options	No finishing options will be selectable
Use large inter-page gaps	Pages will have large inter-page gaps	

Restore Point

Restore point is a new functionality similar to a PC's operating system restore. In the event that a new firmware update causes problems in the printer, the administrator or customer can roll the printer back to a previous state. All code is restored (RIP, Engine, etc.).

If restore point is used, you can "undo" the restore by holding the POR key sequence again.

Available on:	POR Sequence	Description
4.3"and above Touchscreen Code level of EC1 and higher	To go to the Restore Point , do the following: <ol style="list-style-type: none">1. Turn off the printer.2. Press and hold 7 and 8.3. Turn on the printer.4. Release the buttons when the splash screen appears. 	Important Information: <ul style="list-style-type: none">• Subsequent POR's boot to this restore point.• If new code is flashed, that new code becomes the boot point.• Only 1 restore point is kept.• If no code updates have occurred since the machine was built, there is no restore point and the key sequence is ignored.• Only available on eTask machines.

Complex Parts and Procedures

Parts listed in this section are complex for various reasons and are tagged with one or more of the following icons to explain its complexity:

- High degree of technical difficulty in removing/replacing the part.
- Complex/lengthy instructions.
- Special procedures required before, during or after part installation.
- Increased likelihood of servicer error resulting in additional problems, malfunction of the machine or damage.

The instructions for removal, installation and/or special adjustments can be found in the printer's Service Manuals. **Follow the instructions carefully** to avoid additional errors, malfunction or breakage.

Part Removal Tips

- Some removal procedures require removing cable ties. You must replace cable ties during reassembly to avoid pinching wires, obstructing the paper path, or restricting mechanical movement.
- Remove the toner cartridges, imaging unit, and media tray before removing other printer parts.
- The imaging unit should be carefully set on a clean, smooth, and flat surface. It should also be protected from light while out of the device.
- Disconnect all external cables from the printer to prevent possible damage during service.
- Unless otherwise stated, reinstall the parts in reverse order of removal.
- When reinstalling a part held with several screws, start all screws before the final tightening.

For your awareness, the most complex parts include the ones listed below.

Part	Complexity
Control Panel	
Controller Board	
Printhead	
ACM Pick Clutch	
ACM Assembly	
Trailing Edge Sensor	
MPF Solenoid	
MPF Separator Pad	
ZIF Connectors	
LIF Connectors	

Control Panel

The Control Panel houses NVRAM in the printer. When it is replaced, special precautions need to be taken to ensure data is not lost. See the section on *Mirrored NVRAM Components* in this Guide.

Controller Board

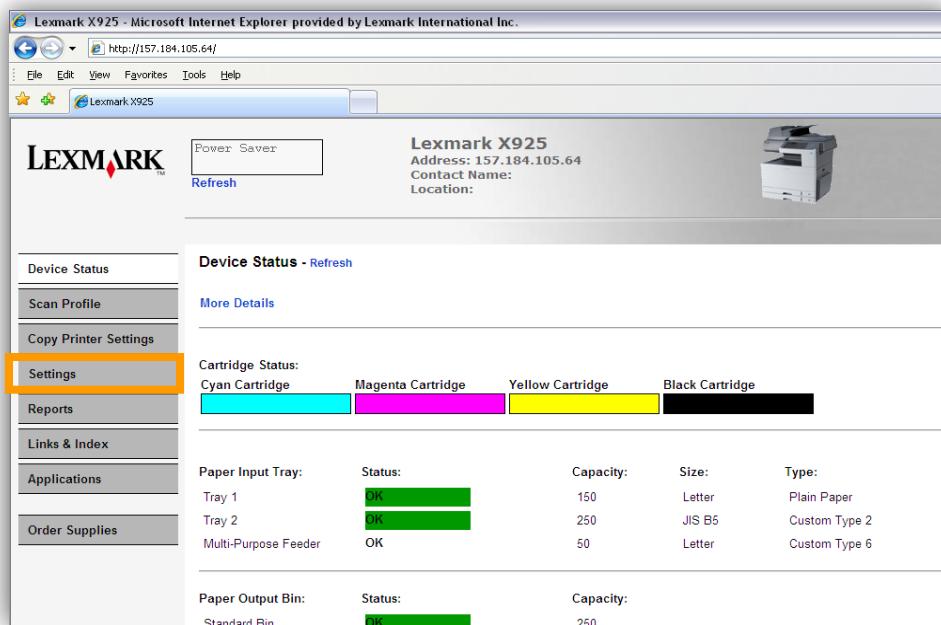
The Controller Board houses NVRAM in the printer. When it is replaced, special precautions need to be taken to ensure data is not lost. See the section on *Mirrored NVRAM Components* in this Guide.

In addition, the Controller Board contains the default and custom eSF applications and settings. These are **NOT** contained in the NVRAM or on a hard drive. A Controller Board failure could result in loss of these applications and their settings if they are not backed up. When a new Controller Board is installed, the Lexmark default eSF applications and settings are loaded.

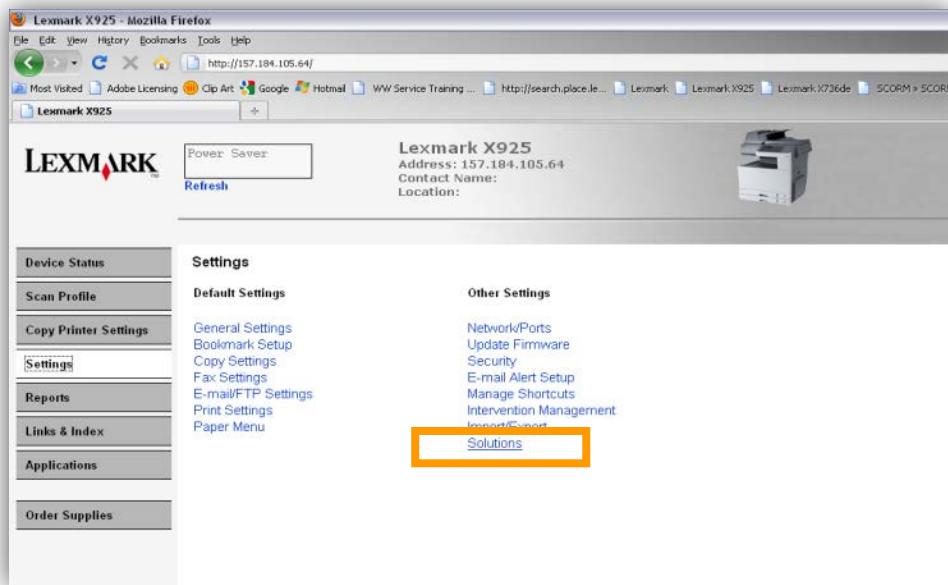
The best practice is for an administrator to have their eSF applications and settings backed up prior to encountering a problem. In case this hasn't been done, an attempt to back up the data should be performed before replacing the Controller Board.

To back up the eSF applications and settings, do the following:

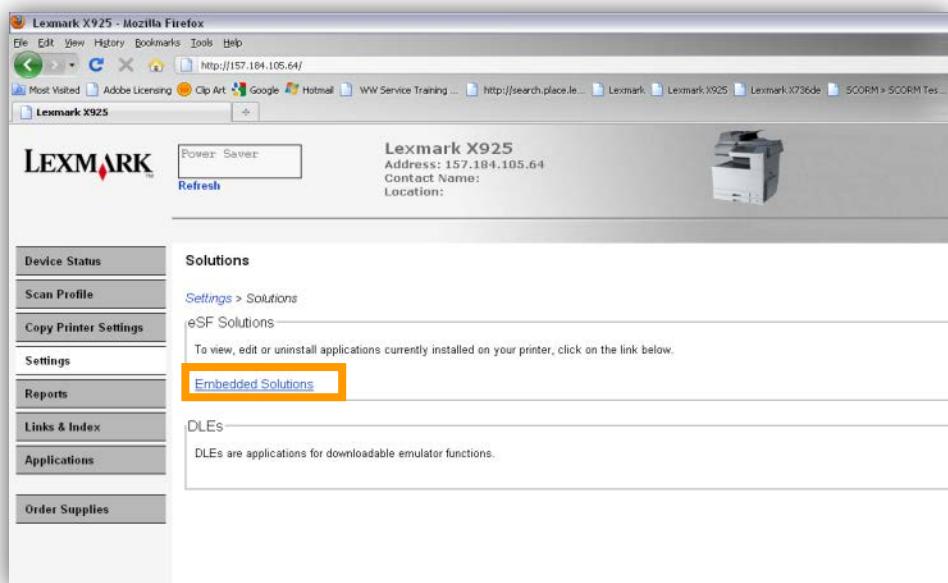
1. Turn off the printer.
2. Press and hold **3, 4 and 6** to boot into Invalid Engine Code mode.
3. Turn on the printer.
4. Release the buttons when the splash screen appears.
5. Access the printer's Web Page from a web browser.
6. Click on Settings:



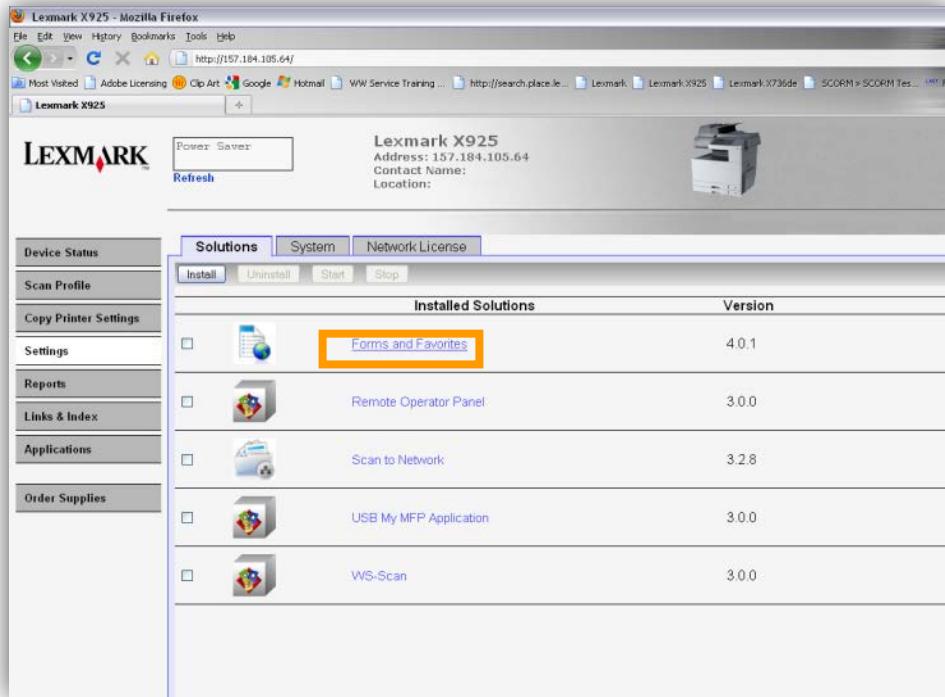
7. Click on Solutions (don't click Import/Export – the explanation is at the end)



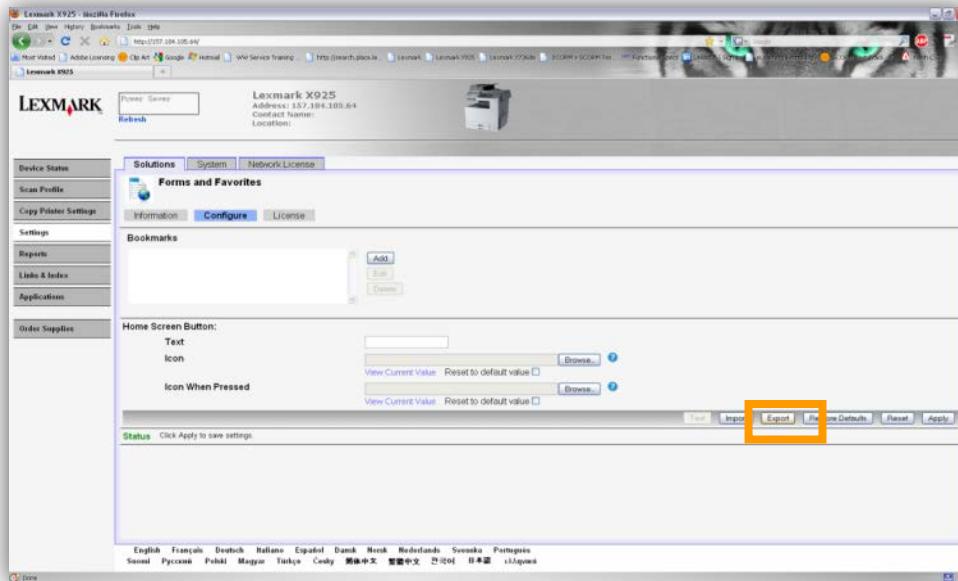
8. Click on Embedded Solutions



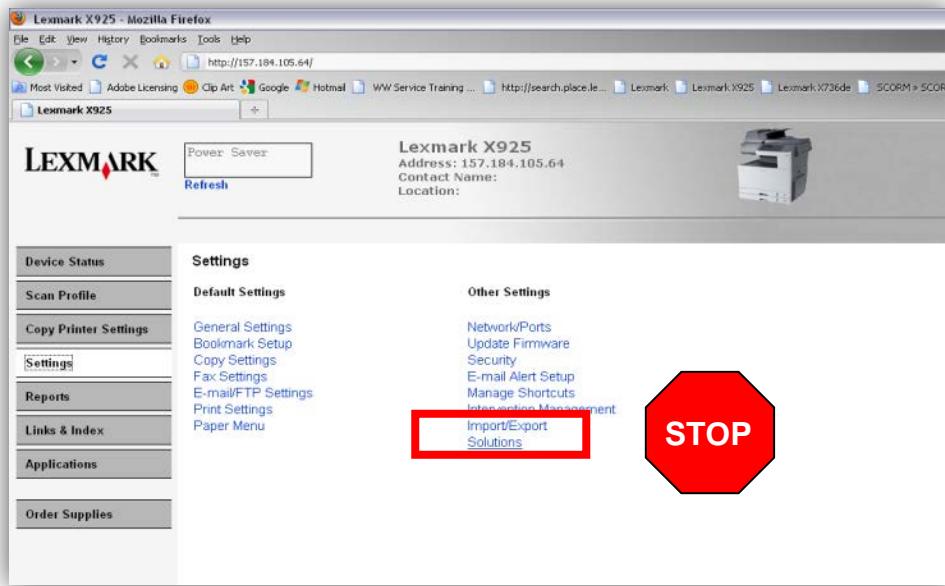
9. Select each application individually by clicking on the name (we'll use Forms and Favorites in this example):



10. Click on Export to create a file of that application's settings



11. If the Web page cannot be accessed, or an error persists despite trying to boot in Invalid Engine code mode, then there is no way to backup the eSF apps. Make the customer aware of this.
12. Don't Use the "Global" Import/Export method to back up the eSF applications and settings. There is a size limit of 128kb on the export file.
13. Customers with a large number of applications or settings may exceed the file size limit and have information truncated in the exported file.



14. Once the new Controller Board is installed, follow the same steps as above, however, you will **Import** (instead of export) the <filename>.UCF file for each application.

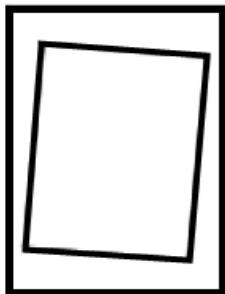
Printhead

Replacing the Printhead assembly is complex as there are critical instructions that should be followed to prevent misalignment and/or skew issues.

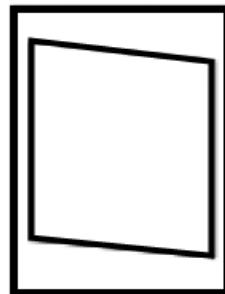
When removing and installing the Printhead, make sure to do the following:

- Use a pencil to mark the screw locations of the old Printhead on the metal frame.
- Align the new Printhead relative to the location of the old Printhead.
- Print a test page and check if the printout is misaligned.

Paper Feed Skew



Printhead Misalignment



- If the printout is misaligned, perform a Printhead mechanical adjustment. See the “**Printhead assembly mechanical adjustment**” section of the printer’s Service Manual for instructions.
- If it doesn’t fix the issue, align the Printhead electronically. See the “**Printhead assembly electronic adjustment**” section of the printer’s Service Manual for instructions.

Notes: This adjustment is not available on the MS310 Series (LED printers).

- Before aligning the Printhead electronically, first mechanically align it.

ACM Pick Clutch

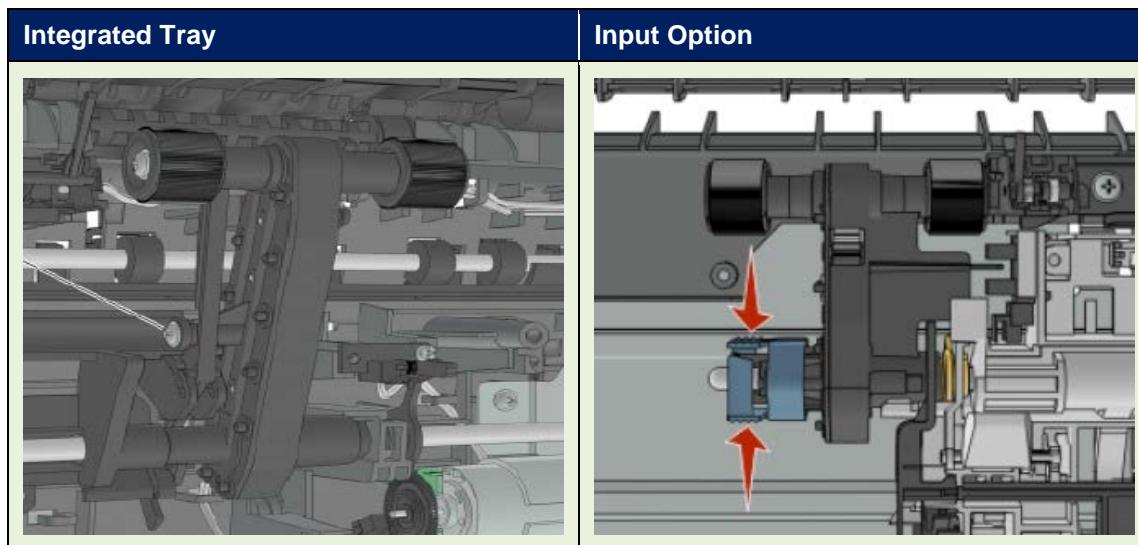
The ACM pick clutch replacement procedure for the **MS310, MS410, MX310 and MX410 Series** is the same with the Ex6x printer series. The printer series not mentioned does not have this FRU part.

The removal of this part is easy but the installation is complex. See the printer’s Service Manual for the removal and installation steps. Each step should be followed carefully.

On the Ex6x, there were a lot of instances that the servicer failed to properly replace the part causing the printer to malfunction or not boot up at all.

ACM Assembly

The hardware design of the ACM assembly in the integrated tray and input option are different. Below is a side by side comparison:



Note that the removal procedure differs, and the ACM assembly found in the integrated tray is more complex to replace than the one in the input option.

Other key differences:

Main Tray ACM Assembly

- The pick tires are replaceable but not the pick rollers.
- For the removal procedure, see “**ACM Assembly Removal**” under “**550-sheet option tray removals**” in the printer’s Service Manual.

Note: The removal procedure for the MS310, MS410, MX310 and MX410 Series is slightly different from the rest of the models in this printer series.

Input Option ACM Assembly

- The pick roller is now replaceable. You can easily replace it by just pressing the latches (refer to the image above), and then sliding it to the left.
- For the removal procedure, see “**ACM Assembly Removal**” under “**Bottom removals**” in the printer’s Service Manual.

Note: Always observe proper routing of cables to prevent obstructing the paper path and/or causing the device to malfunction.

Trailing Edge Sensor ✎ 📄

The removal procedure of this newly-added sensor is lengthy. There are at least nine parts to be removed and important instructions to be followed closely upon installation. See the printer's Service Manual for the removal and installation procedures. And take note of the following tips on how to properly seat the Trailing Edge Sensor cables:

Below are tips on how to properly seat the cables of the Trailing Edge Sensor:

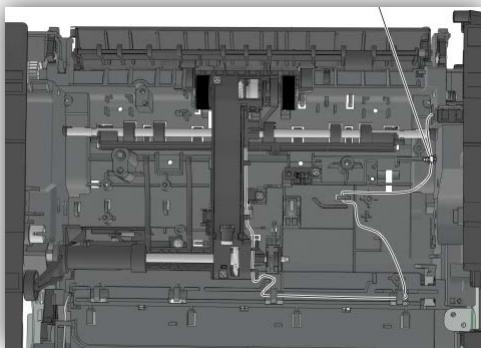
- Always route the cables along the cable holders.



- If the cables are long and/or hanging loosely, twist them and make sure it's tightly looped around the cable holders.



- Route the cable as shown below, and secure it with a cable tie (A).

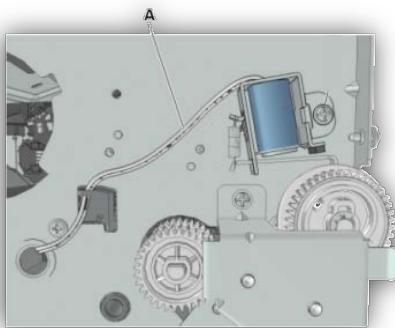


MPF Solenoid

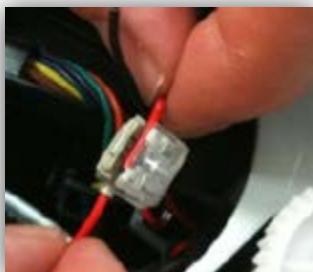
The removal of the MPF Solenoid is easy but the replacement procedure is complex since you have to cut cables at a certain length, connect the cable of the replacement MPF solenoid and ensure there's electrical continuity in the cables.

It is critical for servicers to follow the installation instructions carefully. Failure to do so can cause the printer to malfunction. See the printer's Service Manual for the removal and installation procedures. And, take note of the following installation tips:

- Cut the solenoid cable (A) not less than an inch from the solenoid.



- To ensure there's electrical continuity after replacement, make sure that the stripped end of the cable is positioned under the insulated displacement connector (IDC) contact element when inserting wires.



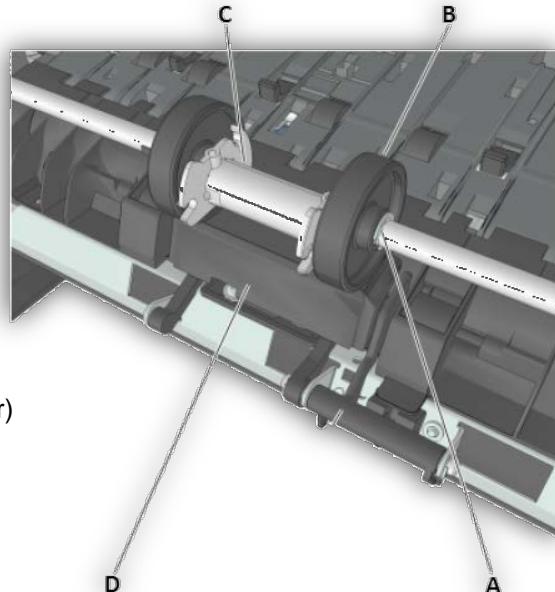
- To prevent the cables from getting tangled and/or obstructing the area, make sure they are routed properly along the cable holders.



MPF Separator Pad

The replacement of the MPF Separator Pad is lengthy and complex. The following parts should be carefully removed and installed during replacement:

1. Right Cover
2. Front Access Cover
3. MPF Pick Roller Cover (with bail)
4. MPF Pick Roller
5. Jam Access Cover
6. Right E-clip (A)
7. Right Restraint Roller (B)
8. MPF Pick Roller Hub (C)
9. Pin (right side of the left Restraint Roller)
10. Left Restraint Roller
11. Left E-clip
12. Shaft
13. MPF Separator Pad (D)



Note that some of the parts to be removed are really small, like the E-clips and restraint roller pin. It is critical to make sure all those parts are re-installed properly after replacing the MPF separator pad. If a single part is missing, the MPF will not work properly.

Mirrored NVRAM Components

Control Panel

Controller Board

 **Warning!** Observe all ESD precautions while handling electronic parts.

 **Warning!** When replacing any one of the NVRAM components:

- Only replace **ONE** component at a time – **NEVER** replace both at once.
- Perform a POR **before** replacing the second component. If this procedure is not followed, the printer will be rendered inoperable.
- These components mirror the critical NVRAM settings for the printer. If you have not already done so, complete the online course **Mirrored NVRAM** from Lexmark's online learning site.

 **Warning!** If you must use one of the components listed above as a method of troubleshooting, boot the printer into **Diagnostic mode only**. This will prevent the NVRAM from copying to the new component. If the printer is allowed to boot normally, however, the NVRAM will copy to the new component and it cannot be used in another printer. It must be returned to the manufacturer.

Zero Insertion Force (ZIF) Connectors

Zero Insertion Force (ZIF) connectors are used in the various boards and cards of these printers. Before inserting or removing a cable from these connectors, read this entire section carefully to avoid damaging the connector or cable.

⚠ Warning! Do not insert the cable so the contacts are facing the locking actuator. The contacts always face **away** from the actuator.

⚠ Warning! Do not insert the cable diagonally into the ZIF socket. This may damage the contacts.

⚠ Warning! Avoid using a fingernail, or sharp object to open the locking mechanism. This may damage the cable.

⚠ Warning! Avoid pressing against the cable when opening the locking mechanism. This may damage the cable.

These are the types of ZIF connectors used in these printers:

- Horizontal top contact connector
- Horizontal bottom contact connector
- Vertical mount contact connector
- Horizontal sliding connector

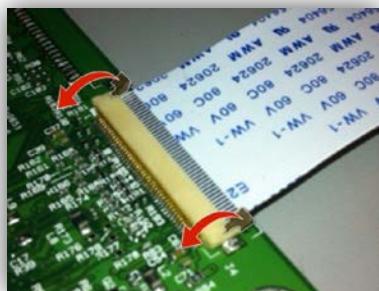
Horizontal Top Contact Connector

The horizontal top contact connector uses a back flip locking actuator to lock the ribbon cable into the ZIF connector. Insert the cable **horizontally** into the connector.

⚠ Warning! When opening or closing this type of actuator, gently lift or close the two tabs located on each end of the actuator. The two tabs should be moved simultaneously. Do not close the actuator from the center of the actuator.

How to Remove a Cable from the Horizontal Top Contact Connector

1. Place a finger at each end of the locking actuator, and then gently lift the actuator to the unlocked position.
2. Slide the cable out of the connector.



How to Insert a Cable into the Horizontal Top Contact Connector

1. When installing the cable, check the locking actuator to ensure it is in the unlocked position. The tabs on the ends of the actuator are vertical when the actuator is unlocked.

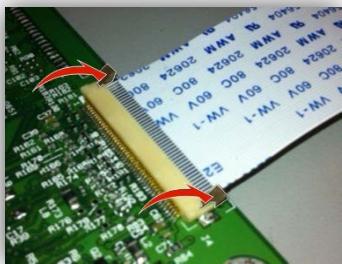


2. Insert the cable with the contacts on the cable facing up. Insert the cable on top of the actuator.



Note: Verify that the cable is installed squarely into the connector. If the cable is not squarely installed, then intermittent failures could occur.

3. Rotate the locking actuator to the locked position. The cable should not move while this step is performed. If the cable moves, open the actuator, reposition the cable, and then close the actuator to the down position.



Horizontal Bottom Contact Connector

The horizontal bottom contact connector uses a flip locking actuator to lock the ribbon cable into the ZIF connector. The cable is inserted horizontally into the connector.

⚠ Warning! When opening or closing this type of actuator, gently lift the center of the actuator using your finger.

- Do not use a fingernail or screwdriver to open the actuator: this could damage the ribbon cable.
- Do not close the actuator from the ends.

How to Remove a Cable from the Horizontal Bottom Contact Connector

1. Place two fingers towards each end of the locking actuator, and then gently lift the actuator to the unlocked position.



2. Slide the cable out of the connector.

How to Insert a Cable into the Horizontal Bottom Contact Connector

1. Check the actuator to verify it is in the open position.



2. Insert the cable into the ZIF connector with the contacts facing **downward** and **away** from the locking actuator. The cable needs to be inserted **below** the actuator.



Note: Verify that the cable is installed squarely into the connector. If the cable is not squarely installed, then intermittent failures could occur.

3. Place your finger in the middle of the actuator and rotate the actuator to the locked position.



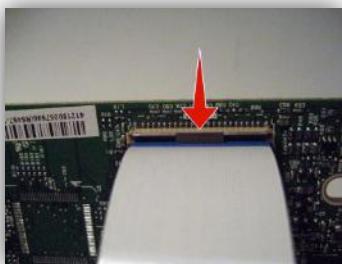
Vertical Mount Contact Connector

The vertical mount contact connector uses a back flip locking actuator to lock the ribbon cable into the ZIF connector. The cable is inserted **vertically** into the connector.

⚠ Warning! When opening or closing this type of actuator, gently lift the center of the actuator using your finger. Do not use a fingernail or screwdriver to open the actuator - this could damage the ribbon cable. Do not close the actuator from the ends of the actuator.

How to Remove a Cable from the Vertical Mount Contact Connector

1. Gently rotate the locking actuator from the center of the actuator to the unlocked position.



2. Slide the cable out of the connector.

How to Insert a Cable into the Vertical Mount Contact Connector

1. When installing the cable, check the locking actuator to verify it is in the open position.

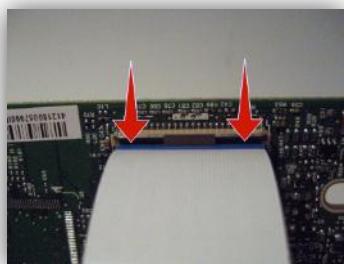


2. Insert the cable with the contacts on the cable away from the locking actuator. Insert the cable **on top of** the actuator.



Note: Verify the cable is installed squarely into the connector otherwise intermittent failures could occur.

3. Rotate the locking actuator to the locked position by pressing down on both ends of the actuator. The cable should not move when this step is performed. If the cable moves, open the actuator, reposition the cable, and then close the actuator to the down position.



Horizontal Sliding Contact Connector

The horizontal sliding contact connector uses a slide locking actuator to lock the ribbon cable into the ZIF connector. The cable is inserted **horizontally** into the connector.

⚠ Warning! When opening or closing this type of actuator, gently push or pull the two tabs located on each end of the actuator. Do not close the actuator from the center of the actuator. Do not use a screwdriver to open or close the actuator. Damage to the cable or connector could occur.

How to Remove a Cable from the Horizontal Sliding Contact Connector

1. Simultaneously slide the two tabs located on the ends of the locking actuator away from the connector.



2. Slide the cable out of the connector.

How to Insert a Cable into the Horizontal Sliding Contact Connector

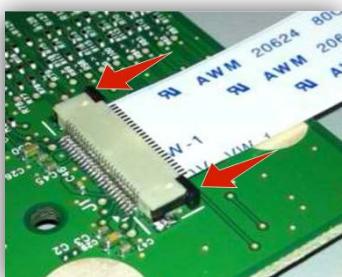
1. Check the locking actuator to verify it is in the open position. If you are opening the connector, pull back on both end tabs using **equal force** to avoid breaking the connector.



2. Insert the cable with the contacts facing **away** from the locking actuator. Insert the cable on top of the actuator.



3. Slide the locking actuator towards the connector, locking the cable into place. The cable should not move after this step is performed. If the cable moves, open the actuator, reposition the cable, and close the actuator in the down position.

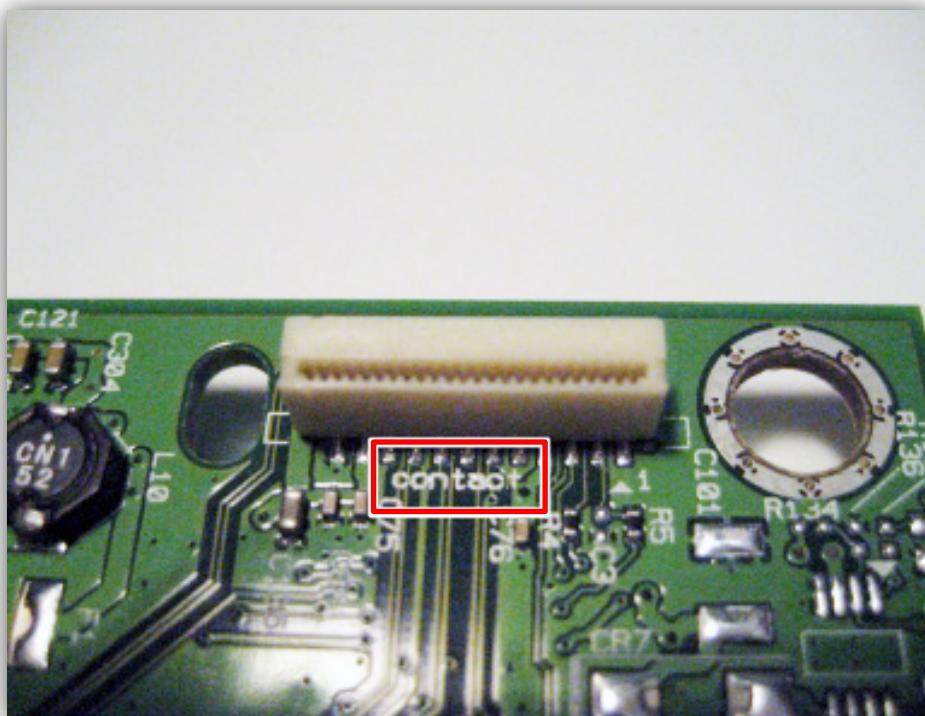


Low Insertion Force (LIF) Connector

⚠ Warning! When installing a cable into an LIF connector, care must be taken to avoid bending the edges of the cables and damaging the contacts on the cables.

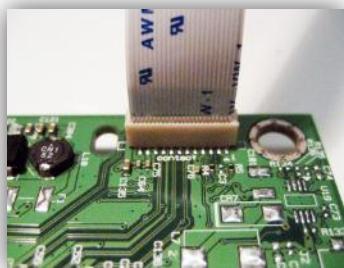
How to Insert a Cable into the LIF Connector

1. Look at the connector and take note as to which side the contacts are located.
2. Look at the circuit board - many boards will have the word "contacts" stamped on them to indicate which side has the contacts.



3. Insert the cable squarely into the connector.

Note: Verify the cable is installed **straight** into the connector. If the cable is not installed properly, then intermittent failures could occur.

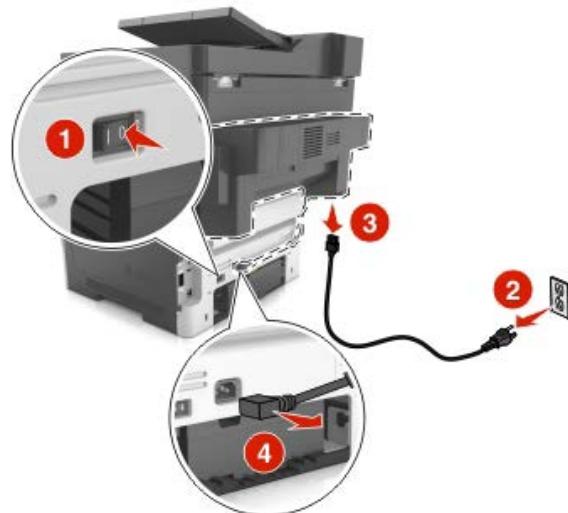


Other Special Instructions

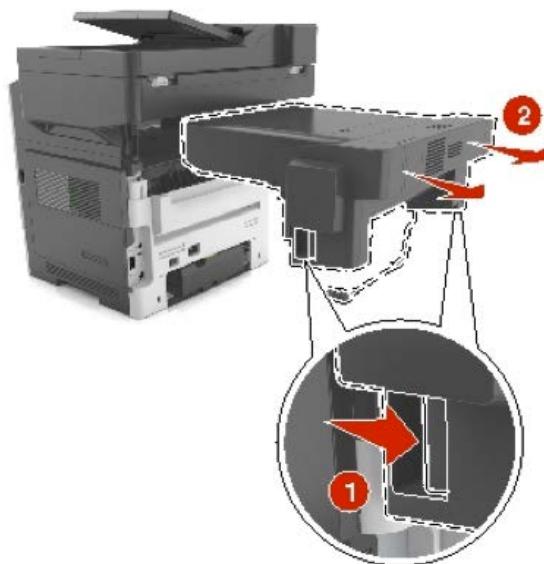
Staple Finisher

The Staple Finisher is new to the Mid-Range Monochrome Laser product family. It is only available for the **MX610 Series**. The removal and installation procedure is really easy. Follow the instructions below on how to properly uninstall the Staple Finisher.

1. Turn off the machine, unplug it from its power source, and then disconnect the staple finisher power cable from the printer.



2. Press the latches to release, then pull the staple finisher off the printer



Cleaning the printer

 **Warning!** Damage to the printer caused by improper handling is not covered by the printer warranty.

1. Make sure that the printer is turned off and unplugged from the electrical outlet.

CAUTION—SHOCK HAZARD: To avoid the risk of electrical shock when cleaning the exterior of the printer, unplug the power cord from the electrical outlet and disconnect all cables from the printer before proceeding.

2. Remove paper from the standard bin and multipurpose feeder.
3. Remove any dust, lint, and pieces of paper around the printer using a soft brush or vacuum.
4. Dampen a clean, lint-free cloth with water, and use it to wipe the outside of the printer.

 **Warning!** Do not use household cleaners or detergents to prevent damage to the exterior of the printer.

5. Make sure all areas of the printer are dry before sending a new print job.

Note: You may need to perform this task after every few months.

Lubrication Specification

Lubricate only when parts are replaced or as needed, not on a scheduled basis. Use of lubricants other than those specified in this service manual can cause premature failure. Some unauthorized lubricants might chemically attack polycarbonate parts.

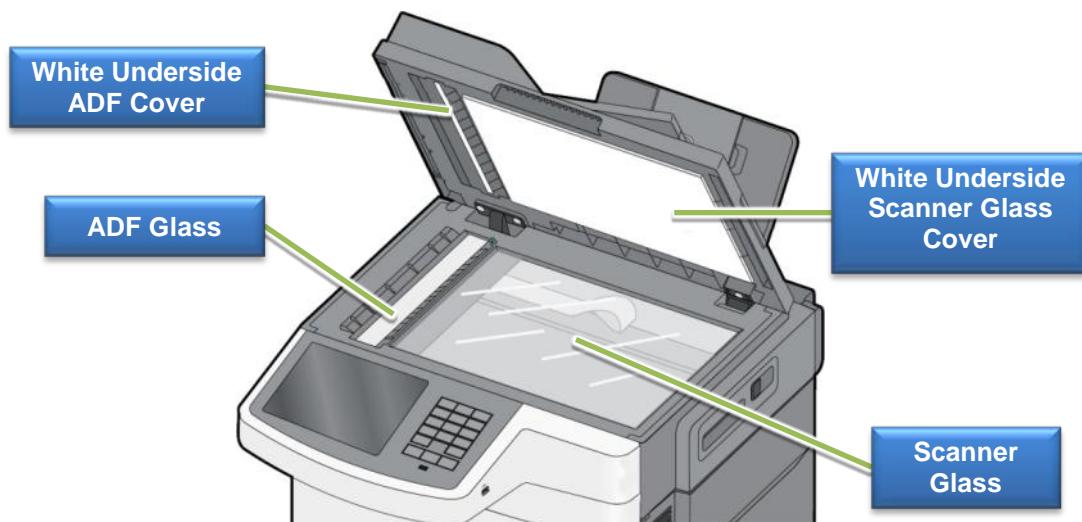
Cleaning the MFP Document Glass

It is important to clean the MFP on a regular basis to keep it functioning properly (about once a month depending on usage). You should also clean the scanner glass if you encounter print quality problems such as streaks on copied or scanned images.

Note: Clean both areas of the scanner glass and both white underside areas.

⚠ Warning! Always turn the printer OFF and unplug it before cleaning.

- Slightly dampen a soft, lint-free cloth or paper towel with water. Do not use any kind of cleaning agent to clean the glass.
- Do not spray liquid on the glass.
- Wipe the scanner glass until it is clean and dry.
- Wipe the white underside of the scanner cover until it is clean and dry.



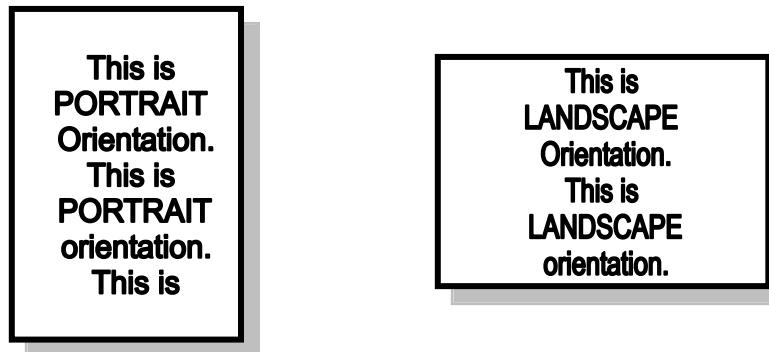
Print Quality Diagnostic Tips

General Terminology

Before diagnosing print quality problems, take a moment to understand the concepts below. This will prevent confusion when diagnosing or escalating a problem.

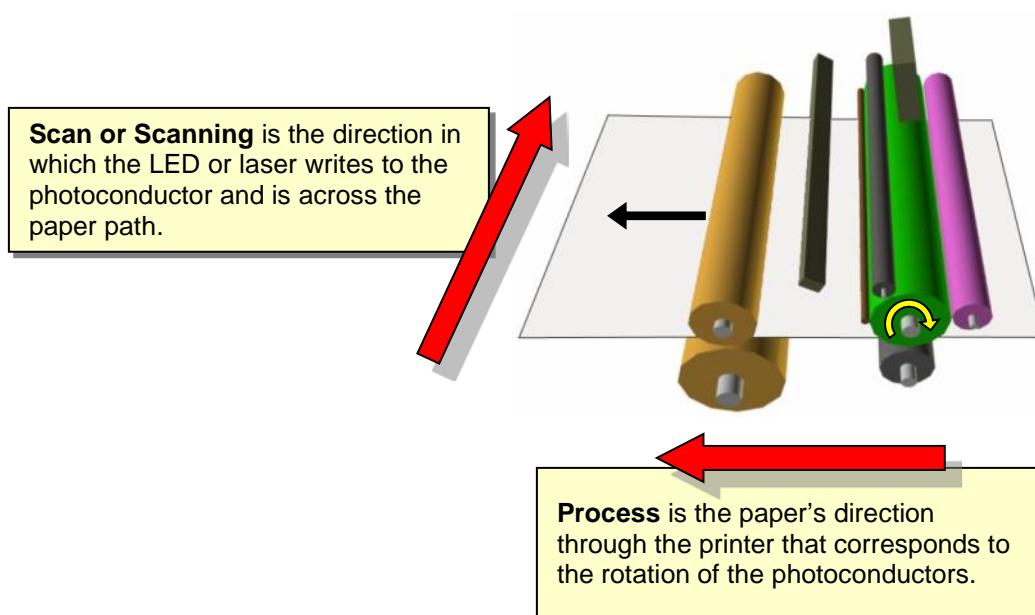
Know your paper orientation when diagnosing a print quality issue.

References to direction such as **horizontal** and **vertical** must be made holding the paper in **portrait orientation** (long edges to the left and right) with the printed side facing you. Don't hold the paper in **landscape orientation**. See below.



Know the direction of the print when diagnosing a print quality issue.

References to the “**Process**” or the “**Scan**” direction refer to the direction in which the paper travels through the printer.



Print Quality Rules of Thumb

If you encounter print quality problems, follow the tips below. Following these simple rules may solve the problem easily and quickly.

- **Always** run a new Settings/Configuration page showing the:
- **Page Count** – Is it time for a maintenance kit?
- **Supply Life** – are any of the supplies low or exhausted?
- **Firmware/Code Levels** – Are the code levels old/obsolete?
- **Media Settings** – does the printer media settings match what's in the Trays?
- **Always** check the **Media Type** and **Size** used.
- Is the media used within the printer's manufacturing specification?
- Are the printer and/or Driver set correctly for the paper type/size?
- **Always** print the printer's Self Test pages.
- How does the print vary from what is expected?
- Try reseating the supplies.
- Check for damage as you reseat them.
- For tricky problems, think about the EP Process Steps. Eliminate the components/areas **that couldn't** cause the problem until you are finally left with **what could**.

Starter cartridges cannot be swapped between printers for troubleshooting purposes as it will post an error message.

Paper Transport Diagnostic Tips

Paper Rules of Thumb

Paper jams and feed problems occur for numerous reasons. Sometimes, failure of the equipment is the cause or it can be the result of other external factors. Before replacing parts for a feed problem, ask these questions:

- **Is the customer using a supported media type?** This is a common problem. Check the printer specifications in the Service Manual or User's Guide if you are not sure.
- **Is the customer using a supported media size?** Check the printer specifications in the Service Manual or User's Guide if you are not sure.
- **Is the customer using a supported media weight?** This is a common problem. Check the printer specifications in the Service Manual or User's Guide if you are not sure.
- **Have you tried printing with a fresh ream of paper?** Paper that is left out of the package for periods of time can dry out or absorb moisture.
- **Have you tried printing from a different input source?** This will help narrow down the cause of some problems.
- **Is too much paper loaded in the Tray?** Make sure the stack height does not exceed the indicated maximum height.
- **Is the paper in the Tray wrinkled, creased, damp, or curled?** Paper will not feed properly if it is damaged. Try a fresh ream of paper.
- **Are different media types and/or weights loaded in the Tray (i.e. the customer has both plain paper and cardstock loaded)?** This will cause misfeeds.
- **Is the relative humidity too high? Too low?** This can affect the media and/or printer and its ability to feed properly. Check the printer specifications in the Service Manual or Technical Reference Guide to see if it is located in an ambient environment.
- **Is the paper loaded properly in the Tray or option?** This is a common problem. Reposition the paper in the Tray or option to make sure that is loaded properly. The paper guides should be flush against the media, but not too tight.
- **Are the feed rollers worn because it is time for a maintenance kit?** Check the page count of the printer to see if it is time for a maintenance kit to be installed.
- **Are there any obstructions in the paper path?** If paper, staples, paper clips or other items are in the printer, they can prevent the media from feeding properly.

Save yourself time and effort and always check these external influences before spending time troubleshooting a supposed equipment failure.

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